

THE DEATH OF MATERIALISM

By the same Author

THE MECHANISM OF SURVIVAL
THE FOUNDATIONS OF SPIRITUALISM
THE MEASUREMENT OF EMOTION
ETC., ETC.

THE DEATH OF MATERIALISM

By WHATELY CARINGTON

(W. WHATELY SMITH)

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TO
GRETA THORNELY
(1892-1932)
WHO WAS AND IS
A PERENNIAL INSPIRATION AND DELIGHT
TO THOSE WHO KNEW HER
THIS BOOK
IS MOST LOVINGLY DEDICATED

THE TERROR OF DEATH

When I have fears that I may cease to be
Before my pen has glean'd my teeming brain,
Before high-piled books, in charact'ry,
Hold like rich garners the full-ripen'd grain :
When I behold, upon the night's starr'd face,
Huge cloudy symbols of a high romance,
And feel that I may never live to trace
Their shadows, with the magic hand of chance ;
And when I feel, fair creature of an hour !
That I shall never look upon thee more,
Never have relish in the faery power
Of unreflecting love ;—then on the shore
Of the wide world I stand alone, and think,
Till Love and Fame to nothingness do sink.

JOHN KEATS

P R E F A C E

So far as my own observations go, most people claim to have a deep-seated intuitive conviction, or "feeling", to the effect that there "must" be a future life of some kind and that annihilation of consciousness by physical death is inconceivable. Few, however, are prepared to give any reasoned justification of the faith that is in them, or even—which perhaps amounts to very much the same thing—to describe at all precisely what form this survival will take.

My own position happens to be just the opposite of this. So far as I can be said to have any "intuitive feeling" in the matter at all, it is that when I die I shall be dead and that there is nothing more to be said about it. As against this, processes as purely rational and as divested of emotional bias as I can make them, lead me to conclude that this extinctive view is quite untenable.

It is with these purely intellectual considerations that I deal here, and I have thought it better to seek to establish as broad and deep foundations as possible rather than to waste time in wrangling about "the evidence for survival" and kindred topics.

The result is that the discussion goes considerably deeper than it can be carried in the language of Talk to Tiny Tots. I have urgently tried to make my conceptions clear, but there is a limit beyond which predigestion cannot well be taken, so that I am forced to call on the reader for a considerable cooperative effort.

One word of warning is necessary. The level of discourse—if I may be allowed the term—rises as the discussion proceeds and it is scarcely possible either to make

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this change perfectly continuous or to divide it into clearly defined stages. But language which is appropriate and useful at one level is often far otherwise at another, and this fact creates serious difficulties for the writer who is aware of it. If he writes throughout in terms suitable to the highest level he will attain, the early parts of his work are likely to be unintelligible or intolerably cumbersome; whereas, if he first uses conversational forms and later discards these, he is liable to be accused of inconsistency, of falling into just those errors which he himself condemns and of obtaining his effects by using the same words in different senses at different times.

I have decided to adopt the second plan as being the lesser evil and have accordingly spoken freely of "consciousness" and "matter" in a conversational way, just as if there could be no difficulty in deciding on the referents of these words, although, towards the end of the discussion and as soon as I am ready to do so, I change the sense, thus treating the conversational referents as "provisional auxiliary constructs" of no permanent utility. But this does not mean that they may not be retained indefinitely for ordinary purposes.

I plead in advance that I am no more to be reprehended for using such verbal scaffolding than is the mason who uses a temporary centering for the construction of his arch until the insertion of the keystone makes it self-supporting.

A valued critic complains that the book lacks Love. I have retorted that the same lamentable deficiency is to be noted in the more characteristic output of Euclid, Newton and Einstein. It is certainly my misfortune, but not altogether my fault, that I am constrained to write in words—from which some degree of emotional colouring can never be wholly eliminated—rather than in the

PREFACE

passionless notation of mathematical symbolism, which I should much prefer. It is for some more graceful pen than mine to clothe this grinning skeleton of reason with the pearly flesh of sentiment, and I am quite incapable of singing narcotic lullabies to the restless.

Except for a few passages of necessarily polemical iconoclasm, I have sought to discount emotional factors to a minimum. If, as is almost inevitable, I have in these passages offended the susceptibilities of the iconolaters concerned, I regret it; but I venture to point out that the possession of susceptibilities to be affronted presupposes either an insecure position or a vulnerable vanity. The conviction that I shall be condemned by bigots of all persuasions is perhaps my chief support in believing that I have arrived at substantially correct conclusions.

Yet, although a ruthless astringency is the only proper temper for theoretical enquiry, it seems permissible, in the comparative intimacy of a preface, to associate ourselves with the spirit of Shelley's admirable commination:

They who, deluded by no generous error, instigated by no sacred thirst of doubtful knowledge, duped by no illustrious superstition, loving nothing on this earth, and cherishing no hopes beyond, yet keep aloof from sympathies with their kind, neither rejoicing in human joy nor mourning with human grief; these, and such as they, have their apportioned curse. . . .

Those who love not their fellow beings live unfruitful lives, and prepare for their old age a miserable grave.

My indebtedness to Sir Arthur Eddington's *Nature of the Physical World* will be apparent on almost every page; as a popular exposition—in the best sense of the term—of the modern scientific outlook it is indispensable.

To Professor Hogben, for his *Nature of Living Matter*, I have made, I hope, adequate acknowledgments in the

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text. I have found it necessary to dissent vigorously from certain of his views; but I should like to make it clear that in taking him as a typical but authoritative exponent of an important school of thought, I have no intention of saddling him, even by implication, with responsibility for all the ineptitudes uttered by materialists who might claim affiliation with that school.

I am also deeply indebted to MM. Ogden and Richards' *Meaning of Meaning*—a work which, though a little beyond the scope of a kindergarten curriculum, should be read by all who wish to avoid, or even become aware of, the linguistic snares which are liable to entrap the unwary.

Finally I must pay a specific tribute to Dr. Vaihinger's *Philosophy of "As If"*, surely one of the most important and illuminating contributions to the methodology of thought, and hence to clear thinking itself, of recent years.

ROTTERDAM

September 1932

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GENERAL INTRODUCTION

I

It is to be hoped that the subject-matter of this book will be sufficiently indicated by the title, although purists might prefer some such rigmarole as *A Tentative Exposition of Certain Considerations Calculated to Refute the Doctrines of Philosophical Materialism*. Such a title, however, would be prohibitively cumbrous—not to say alarming—in these days, so that *The Death of Materialism* must serve, even though it be more suggestive of historical retrospect than of living controversy.

Actually, it would be contrary to experience to suppose that any single work could destroy so formidable and deep-rooted a doctrine as Materialism, or even administer an effective *coup de grâce*. Beliefs, however erroneous, do not die in a spasm as a living creature may; on the contrary, it often happens that at some one stage of their career they appear puerile to one class of thinker, indisputable to another and incomprehensibly advanced to a third. Moreover, it is often convenient to retain, for certain practical purposes, forms of words which have long been recognised as fictional and discarded from advanced theory.

From such a point of view it would be imprudent to locate the Death of Materialism in the Past, the Present, or even the Future; for just as some form of the doctrine has doubtless been professed ever since opinions began to differ, so it is unlikely to lack exponents until controversy ceases to divert mankind.

None the less it would seem that the development of modern thought, or—perhaps I should say—of modern

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methods of thinking, has brought us to a point at which we can see clearly not only that Materialism as a serious philosophic attitude is doomed to extinction but also, which is in many ways more important, the reasons why this should be so.

2

There is no need to attempt here any rigid definition of Materialism; broadly speaking, most people know what is meant by the term and little confusion would arise if I assumed that my readers and I were unanimously agreed on its usage. None the less it will be profitable to devote a few paragraphs to identifying the subject of our discourse and to drawing at least one distinction which seems worthy of attention.

We note, then, that the words Materialism and Materialist are commonly used in two main ways. Most frequently they refer to a general habit of life, so that when we speak of a man as a materialist it is equivalent to saying that he is predominantly interested in such mundane activities as eating and drinking, money-making, sport and sexuality. Of such persons, who form the great majority of mankind—at any rate in the Western world—there are, naturally, many degrees. At one end of the scale we find the primitive type whose highest aspirations consist of unlimited beef, beer, 'baccy and betting, at the other the sophisticated sensualist who cultivates an epicurean palate and an eclectic taste in pictures, music and salacity. All such materialists are alike, however, in tacitly adopting *Carpe Diem* as their motto and in devoting their energies, immediately or ultimately, to the gratification of their senses.

But materialism of this everyday or colloquial kind

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may be distinguished from the considered philosophic attitude to which the word in its second usage refers, for

. . . the philosophical materialist may be ascetic in his mode of life, dedicated to others, utterly forgetful of himself in his endeavours to improve the lot of human kind, yet . . . he will consider the world of spirit, life or consciousness as vague and unreal, and proclaim matter to be the only and final reality, mind or consciousness being but a result of material processes. In his observation of the world around, he sees that when the material form is destroyed or impaired, life or consciousness no longer manifests itself, and his conclusion is that with the destruction of the form of life which was its result has ceased to be also.¹

To me, the philosophical materialist, however he may seek—as he often does—to evade the issue or disguise his convictions by the affectation of a tolerant nescience, is essentially one who believes that the substantial objects of the physical world, which he can touch and see, or at any rate detect with suitable instruments, are alone “really real”. He may, from politeness or other motives, refrain from open mockery at the mention of “a soul”, of “life after death” or of “spiritual existence apart from matter”; but these concepts have no serious significance for him, and he will dismiss the words as mere symbols devoid of reference prompted by no more than the sentimental imaginings of the foolish. In no circumstances will he treat them as of genuine importance and will instantly repress as an unworthy weakness any momentary tendency to do so. Any difficulty he may encounter arising from the fact that he himself is conscious and knows it he will evade by murmuring “purely epiphenomenal” and passing by on the other side.

¹ J. J. van der Leeuw, *The Conquest of Illusion*, pp. 121, 122.

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It is with materialism in this sense, whether overt or disguised, that I am here concerned; but it would scarcely be worth attacking were there not, as a general rule, a fairly close connection between conduct and belief. If there were none, materialism would be no more than a harmless idiosyncrasy—about as important as whether a man who has attended neither University chooses to label himself Oxford or Cambridge on Boat Race day.

In general, however, whatever exceptions may be cited, there can be no doubt that philosophical materialism—implicitly if not explicitly—is the underlying creed of practising materialists, regardless of whether or no they profess and call themselves Christians or adherents of any other faith for which the Immortality of the Soul, or some corresponding belief, is a fundamental tenet.

It is easy to understand that this should be so. I am by no means certain that a policy of rapacious self-seeking, with “envy, hatred, malice and all uncharitableness” is, logically, a necessary outcome even of an unqualified belief that physical death is the end of all things. But it can hardly be disputed that a vivid conviction to the effect that our present life is but a small, albeit important, fraction of an indefinitely greater whole is bound to lead to a radically different scale of values with a tendency to corresponding different behaviour. But we are not, for the moment, concerned so much with what is logical as with the way in which people do in fact behave.

Strictly speaking, I see no *a priori* reason for associating altruism with a belief in survival (for this involves a pre-judgment as to the nature of *post-mortem* existence) and, personally, I question whether belief in a future life is the proper basis for unselfish behaviour, in that this savours too much of “hope of reward or fear of punishment”. Historically, however, it seems indisputable that,

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in actual practice, socially beneficent conduct is more often found in conjunction with some form of idealistic¹ belief than with any materialistic philosophy. If this be true, then the discrediting of materialism would appear to be a socially desirable enterprise, quite apart from the quest of "Truth for Truth's sake".

3

The considerations just mentioned clearly constitute one good reason for writing a book of this kind, even though it would be vain to imagine that any startling effect is likely to be produced.

No book, however closely reasoned and brilliantly written, could be expected to revolutionise human thought; it is rather by the cumulative effect of very many small contributions that the centre of gravity is gradually shifted. Moreover, a mode of exposition which will appeal to one type of mind will fail with another, so that any sensible author must expect to leave cold at least as many readers as he succeeds in moving.

There is, for example, a class of materialists who—whether wittingly or not—profess materialism more in order to "serve some private end", like the mad dog in the verses, than because they have found their position logically inevitable in face of the observed facts. Such as these, on whose psychology I touch in the next chapter, I cannot hope to influence; nor do I suppose that what follows will make much appeal to those of the opposite

¹ In the following pages I shall use, *faute de mieux*, the words "idealism", "idealist" and the like to refer to views broadly opposed to Materialism as described above and not in the sense established by philosophic usage. The word "spiritualism" would be preferable in many ways, but this has been appropriated by a sect with whose views I am not wholly in accord.

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persuasion who have long ago decided that they know all about it and have closed their minds to doubt.

Pessimists will conclude that I am foredoomed to fall between these two stools; I prefer to think that I may "fill a long-felt want" by catering for an intermediate class, which I believe to be large, who are genuinely not sure what they may reasonably believe. Of these a great number are rightly nauseated by the clotted nonsense which the more vocal opponents of materialism too frequently emit. Equally rightly they are impressed by the almost terrifying successes of modern physical science. But with science they associate mechanism and with mechanism materialism, so that the materialistic view of life seems to them to be sponsored, as it were, by every gramophone that plays and every aeroplane that flies. On the other hand, quite apart from personal predilections, the mere awareness of being conscious makes the idea of total extinction at death even less conceivable than the auriferous Valhalla of a still lingering theology.

Many such persons, moreover, have formed some idea of what is meant by intellectual honesty and try to practise it. To these, who are likely also to have a smattering of psychological knowledge, their natural distaste for annihilation increases the difficulties of the position, since they realise that a desire for continuance might easily lead to the acceptance of views not warranted by evidence.

For the benefit of this class it seems a useful work to show that the materialistic standpoint is not logically tenable even by those who have some personal bias towards it, while for those who have not there is no necessity henceforward even to consider it seriously, except as a matter of courteous tolerance towards others who know no better.

For me, who have so much to say about the unconscious motives of others, it would be rash to proffer any complete account of my own, but apart from the vague egotism, from which, I suppose, no writer is wholly free, there appear to be two other main reasons for attempting the discussion undertaken here.

The first is that I think it would be rather futile to embark, as I hope in due course to do, on a variety of philosophic or quasi-philosophic enquiries, all of which are incompatible with materialism, without first showing that materialism is untenable. In other words I am anxious, as opportunity shall serve me, to deal with many matters of more immediate interest—to most people at any rate—than the theoretical principles treated here. But these theoretical principles are of fundamental importance and must be disposed of once and for all; otherwise all subsequent discussions must run the risk of being dismissed as invalid, on the ground that the idealistic assumptions made before they are begun are themselves unsound. So far as possible, in fact, I prefer to build my philosophic house from basement to attic with my own hands rather than on the foundations of others, which do not seem to me altogether secure nor well suited to the projected design.

Secondly, I am bold enough to believe that numerous as have been the attempts to refute Materialism for good and all, none have been conducted quite on the right lines. That many such attempts have been highly successful—in the sense of persuading people to reject materialism as a creed—I do not deny, and, in so far as it may be preferable to hold the right views for the

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wrong reasons than not to hold them at all, they are to be applauded. In practice, of course, any competently directed emotional appeal will produce more temporary effect in an hour than rational discourse in a lifetime. But such results are impermanent and insecure; whereas if we can once establish an idealistic position incontrovertibly, we shall be able to go ahead with fair confidence, free from the fear that our foothold may suddenly be cut from under us.

When I said that previous attempts to refute materialism (and I had all types in mind) had been conducted on the wrong lines, I necessarily and wittingly implied a belief that I can do better. This is likely to sound vain-glorious, not to say conceited, but I do not feel guilty of either fault. I am not, as it happens, of opinion that previous attacks have been well directed, and I do believe that I can at least indicate the principles which should guide the campaign even if I fail, through lack of skill, to drive it home to final victory. But this reflects no particular credit on me. The points which appear to me to be crucial are the inevitable outcome of the tendencies of modern thought, so that to arrive at them demands only a trifling extrapolation; that they should have been almost thrust upon my attention is a matter more of good luck than good management, and I should be an unprofitable servant indeed if I did not try to arrange them intelligibly for the benefit of others.

I may add that the lamentable pseudo-reasoning commonly adduced in support of the most laudable views is so well calculated to alienate the intelligent that I am anxious to furnish idealists of all persuasions with ammunition fit to use.

This brings us to the procedure I propose to adopt, the ordering of which in a tolerably consecutive fashion has been by no means the least difficult part of my task.

There are notoriously more ways of killing a cat than by choking it with cream, and if you are accused of stealing your neighbour's motor-car various courses are open to you. You may set yourself to discredit the character of his witnesses, to controvert the evidence he adduces or to prove that he never owned a motor-car. Of these the first is the best fun, the second the most usual, while the third—if you can do it—offers incomparably the best chance of securing an acquittal.

Much the same applies to controversy. A good deal can be done by discrediting your opponents, in the sense of showing that they are likely to be actuated by ulterior motives of an irrational character or arising from pathological states. This is well worth doing, apart from an amusement it may give, for it tends to put people on their guard and to make them ask more frequently "What is the motive behind all this talk?"—a question which may often save us the trouble of discussing whether the talk in question is valid or not.

Needless to say, the discovery that there is, or may be, an ulterior motive behind the profession of a particular set of views does not in any way prove that those views are unsound; what it does do is to divest them of any adventitious support they might otherwise derive from the status or Authority of their exponents, leaving them free to stand or fall on their own intrinsic merits. This is very important, because one of the chief difficulties about thinking clearly is that of stripping from the propositions under discussion the disguising accretions which

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they have accumulated in the course of their career, so that the problems themselves, and not other people's opinions about them, may be clearly seen.

Accordingly, I have decided to devote a chapter to a brief and necessarily incomplete sketch of some of the psychological factors which appear to determine the profession of views on Materialism whether favourable to that doctrine or not.

My object is partly egotistical, in that I wish to emphasise that I have no personal axe to grind and that, so far as previous arguments are concerned, my attitude is rather one of "a plague on both your houses" than of adherence to any particular school or creed. More important, however, is my hope that such a sketch may help to induce in my readers a determination to follow an independent line of thought, untrammelled by prejudice in either direction. Only so can they hope to arrive at useful conclusions.

6

Straightforward argument—if this be not a contradiction in terms—is the standard and best accredited controversial procedure; its function is supposed to be to ensure that, where there is a real problem to be solved, all available evidence shall be brought forward for thorough examination and testing, and that no errors in formal reasoning have been introduced between the assumptions made and the conclusions reached. Even more important should be the discovery of what the underlying assumptions really are, in order that these may be scrutinised and challenged. In practice this procedure is usually debased to an attempt to score debating points off the opponent.

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In this case our difficulty is that there is nothing in the nature of what I may term a standardised argument for Materialism which can be selected for systematic criticism and it is, indeed, difficult to put up a plausible case for it at all. One can scarcely avoid the suspicion in fact that it was only the preoccupation of nineteenth-century scientists with engineering and mechanical problems that invested it with a spurious plausibility and brought about the popular vogue which it subsequently enjoyed.

I have done my best, however, in my second chapter, to make out as good a case as I can for purposes of criticism at the argumentative level, and have concentrated in my third and fourth on the special case presented by mechanistic biologists. Their line of argument seems to me by far the most important in the field and it is only natural that it should be so, since, after all, it is the biologists who are chiefly concerned with the study of living organisms among which are manifested—notably in ourselves—the phenomena commonly described as conscious, mental or spiritual.

The biological argument, like that from general considerations, seems to me not difficult to meet, but I feel strongly that the issue is not to be brought to a final settlement by anything that can be said on what I have called the argumentative level. Arguments have a habit of beginning in the middle, on the basis of all kinds of assumptions which can only with great difficulty be disentangled from the controversial verbiage and exposed to view. Thus, attacks and counter-attacks are vehemently launched and local successes are scored which greatly excite the combatants; yet, as often as not, neither side has any clear idea as to "what they fought each other for".

It is, accordingly, necessary to take the discussion very much deeper than is done in normal controversy and to exhibit certain fundamental assumptions, normally taken for granted, on which the very existence of the dissension depends.

I approach this part of the discussion by way of an attempt to develop a not obviously ridiculous Theory of Consciousness at a level on which both parties may reasonably be expected to meet. This procedure provides a convenient stepping-stone by which we pass to the subject-matter of my second main Part, which is devoted to demolishing the supposedly axiomatic assumptions just mentioned and thus to demonstrating that the alleged difficulties do not in fact exist, so that the controversy concerning them is an artificial controversy.

This plan, like that of proving that your accuser never owned a motor-car, is by far the best way of settling a problem and may fairly be described as a characteristic method of modern thought.

Two illustrations from the domain of physical science will serve to show the kind of thing I mean.

Time was, for example, when scientists were much exercised in their minds as to how Energy and Matter contrived to interact. The essential feature of Energy was that it was "non-material" and of Matter that it was massive or inert, that is to say, "non-energetic". How, then, it was asked, could such radically disparate entities have any dealings, so to speak, with each other at all? How could the gulf between them be bridged? This problem was never *solved*, the gulf was never bridged. What happened was that Einstein showed, in effect, that

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Mass and Energy were identical so that the gulf and the problem quietly disappeared together.

Much the same happened with the Luminiferous Ether. Here the problem was to devise an ether which should combine a variety of irreconcilable properties. It must, for instance, be strong enough to resist the gravitational pull of the sun on the planets, but it must also be so tenuous, even compared with comets, as to offer a negligible resistance to motion through it. Jellies, squirts, vortices, foams, gyrostats and all manner of mechanisms were invoked without success. If the ether devised was satisfactory for one purpose it was unsatisfactory for another; the structure, for example, which "explained" the electro-static field of a charged particle at rest failed to explain the electro-magnetic field of the same particle in motion, and so forth. Again the problem was never solved—and never will be. Relativity theory has shown that there is no need to talk about Ether at all and the problem of its mechanical structure has accordingly ceased to exist.

In somewhat the same way, I believe, the traditional feud between materialists and idealists (or between mechanists and vitalists, if you prefer these labels) may be shown to be concerned with an entirely artificial problem arising solely out of taking false assumptions for granted.

8

My third and last Part is essentially devoted to an attempt at reconciling, or unifying, the two great bodies of human experience which may broadly be distinguished as Rational and Mystical, and have usually been regarded as antithetical or at least disparate.

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It is again more for the sake of a convenient stepping-stone than as a matter of logical necessity that I approach this topic through the consideration of certain phenomena—Telepathy, Clairvoyance and the like—to which collectively I have applied the epithet Paragnostic. I begin by dealing briefly with what is, or should be, meant by “proof”, and in the light of this discussion I examine the status of these phenomena, proceeding thence to various theories which have been put forward to account for them. These theories I dismiss, either wholly or in part, finding the solution of the problems concerned to lie in community of consciousness, or extension thereof as the case may be, rather than in the transmission of thought or supernormal perception as normally understood.

The final unification of the Rational with the Mystical, to which this view leads, takes us back—by completing the triangle as it were—to the position reached at the end of the Second Part.

PART I

CHAPTER I

THE PSYCHOLOGY OF PROFESSION

I

It is said that to the late Professor Sidgwick, while asleep, there occurred the following lines :

We think so because other people think so ;
Or because—or because—after all, we do think so ;
Or because we were told so, and think we must think so ;
Or because we once thought so, and think we still think so ;
Or because, having thought so, we think we will think so.

The mildness of expression is, one feels, no small tribute to the innate charity of the distinguished scholar, who might well have adopted a far more cynical tone.

It is a commonplace of experience that to be persuaded by argument is very different from being truly convinced, and I personally would go so far as to say that human beliefs very seldom have a rational origin. By this I mean that we do not, as a rule, believe statements *because* they are proved to us ; we accept them first and then condescend to acquiesce in such arguments for their support as may be forthcoming. If we find the statements unacceptable in the first instance, we merely say that the arguments must be faulty. If pressed in the matter we either lose our tempers or set to work to excogitate “reasons” for their being so.

It is the rarest thing in the world for any problem of real importance to be considered genuinely on its merits. Nor is it so outrageous as it sounds to say that the dominant factors in forming beliefs and in deciding what beliefs shall be expressed are fear, laziness and other

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derivatives of self-seeking. But although 90 per cent. of professions be hypocritical, we must in fairness and in pity remember that the underlying motives are usually unconscious.

Consider, for example, this matter of the survival of death which is so intimately bound up with materialistic theory and its opposite. Almost anyone with claims or pretensions to being considered thoughtful will profess some measure of interest in the subject and most would admit that there could be nothing of more fundamental importance for the human race. To hear many people talk, indeed, one might suppose that a yearning humanity was waiting, longing, hoping for some ray of light in the darkness of their despair. Actually, they appear to be far more interested in football, racing and the domestic irregularities of their fellows. Yet it may well be that these paltry preoccupations are, fundamentally, distractions or narcotics, valued as affording an escape from "the menace of the years . . . the horror of the shade", since even counter-irritants have an alleviative value.

The defence mechanisms of the mind, whereby disagreeable thoughts are comfortably side-tracked, are certainly very effective. This is why such professions of interest as we hear are seldom more than mere lip-service concealing a profound aversion to thinking about anything so unpleasant as death.

As will be seen in a later chapter, rigid proof of survival appears to be impossible on account of the nature of the subject, so that all that can be done is to establish a probability in its favour and gradually to augment the value of that probability.

That this value is already enormously higher than is commonly suspected I propose to show: that it can be

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steadily increased by judicious experiment and the analysis of suitable data seems practically certain.

It is likely, however, that a long time will elapse before the demonstrable probability will reach so overwhelming a value as to be universally coercive. This is probably just as well, for if anyone were to produce, at the present time, a proof of survival so cogent that no sane man could dispute it he would become a strong candidate for assassination. Nothing could be better calculated to disrupt our existing civilisation, built so extensively as it is on an implicit materialism with its correlates of lust, avarice and exploitation.

2

As a rule, the statement "I believe so-and-so" is precisely equivalent to "Having found it too much trouble to think for myself, I have formed the habit of reacting with these words to any question on the subject which may be asked".

So-called "sincere agnosticism", for instance, is usually nothing but a more or less hypocritical dodge for avoiding, on the one hand, the task of thinking for oneself, on the other, criticism for not attempting to do so. A man has only to say "These things are too deep for me", with an assumption of humility, and he instantly has an excellent excuse for shelving the whole matter; but again we must in fairness admit that in nine cases out of ten they really are too deep for him. My point is not that such persons should be blamed, or even derided, for their inability to think, but that Agnosticism as an attitude gains no support from their professions.

This is a comparatively innocent example. More frequently, the expression of opinions on the subject is

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the product of the will to tyrannise, of cowardice, of hypocrisy or of an urge towards self-aggrandisement.

Of tyrannising as a motive the history of priestcraft offers innumerable examples. Intimidation and extortion, by threats of Hell and promises of Heaven, have everywhere gratified the ambitions of hierophants—who surely have brought more fear than consolation to mankind. It is cheering to reflect that the devil, *pour ainsi dire*, must long have heated a special cauldron for those who have thus wantonly terrified their fellow men in the name of God and to the advancement of their church. No such procedure could be founded on materialistic philosophy, so that the existence of an ulterior motive here is obvious enough.

I suppose that the great majority of those who profess a belief in survival do so on the ground that someone else has told them something about it. These will particularly resent my strictures, but the fact remains that this attitude, however much they may seek to dignify it by talk of religious revelation, is usually just another expedient for avoiding thinking for oneself. It is so much less trouble to put one's thinking out, like one's washing, to be done for one than to get down to the job oneself. This laziness is usually reinforced by fear, particularly by the fear of flouting convention. Even to-day overt atheism and materialism are scarcely thought respectable, save in very limited circles, although their deadly dullness might well have won them the *entrée* to Provincial Society at least.

Very common and particularly weak is the attitude of those who opine that "there must be a future life,

because, if there were not, there could be no justice in the Universe”.

If we possessed a Museum of False Thinking, like that of Bad Taste in Berlin, this masterpiece of ineptitude would assuredly occupy a conspicuous position; for it consists, one may fairly say, of deducing the existence of a quality from the observed lack of it. As who should say: This man's life appears altogether blameless, but he must have committed crimes; otherwise he would not be a criminal. Could even the French policeman of fiction commit so flagrant a *petitio principii*?

The exponents of this view, full of a vaguely roseate sentimentality, find it comforting to believe that the Universe is ordered by Love and Beauty and Goodness and Truth and all the other pleasant-sounding words; easily they assure themselves that it must be so ordered, and end by making deductions from the “fact” that it is so ordered. Actually, of course, sentiment of any kind should be rigorously *tabu* in investigations of this sort, for fortitude is the most important quality of the philosopher. We have no *a priori* right or reason whatever for expecting to find either justice or mercy as parts of the general scheme of things; remarks about them should be founded on observation only, and no enquiry can be profitable except in so far as it be conducted by the aid of pure reason—which is guesswork checked by logic. In the course of it our head is quite likely to be bloodied, but let us resolve at least to keep it unbowed.

Let me again make it clear that I am not denying that Love and Justice and all the rest of it are to be found in the Universe. They are. But we must find them for ourselves, not assume them first and then use the assumption as a basis for argument.

Similarly in origin, but infinitely more worthy of sym-

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pathy, is the belief which arises from the longing of the bereaved for reunion with those from whom death has parted them. Such believers usually lack, in common with those just mentioned, the moral courage resolutely to face the possibility—just as probable *a priori* as the alternative¹—that the universe may not happen to conform to their desires; but at any rate a belief arising from love, however illogical it may be, is more admirable than disingenuous question-begging.²

There are also not a few who, genuinely wearied of this life, hope on their own account for some better thing in the next:

Worm at my heart and fever in my head—
There is no peace for any but the dead.
Only the dead are beautiful and free.
*Mortis cupiditas captavit me.*³

Not far removed from these positions is that of those who quite simply claim to have an inner, instinctive “feeling”, in no way based on reason, to the effect that survival of death, with all that it implies, is a fact in nature. Here,

¹ Considered strictly *a priori* all propositions are equally likely.

² It may be mentioned in passing that although, for reasons with which this book is largely concerned, I have no appreciable doubt that some measure of communication with the “dead” may be established under suitable conditions, yet I suspect that the practice is to be deprecated. This is not because of the dangers involved, against which an instructed technique should be a sufficient safeguard, but because it necessarily encourages and even demands the retention by the deceased of their mundane “personalities”, and these “personalities” constitute precisely the limitations which it should be our chief object to eliminate, whether in this life or the next. Moreover, such practices are, for the most part, more or less selfish at bottom; it is for our interest and consolation, not theirs, that we seek to communicate.

³ With acknowledgments to Colonel John Buchan: *The Blanket of the Dark*.

again, we may fairly suspect the unconscious transformation of a wish into a belief, but there is at least a redeeming feature of honesty in not attempting to bolster up personal conviction with specious reasoning. None the less a distaste, albeit unrecognised, for hard thinking is again likely to be a powerful factor in the adoption of such an attitude.

It is difficult to say how far similar criticisms are applicable to those who sincerely maintain that they have themselves enjoyed experiences of non-physical states of being so vivid that no doubt of their veridicity could possibly be entertained. Personally, I feel reasonably confident that many such experiences are just what they purport to be in all essential respects; very possibly, indeed, experience of this kind is the only irrefragable basis of knowledge in this, or perhaps any other, subject. But this concession would be unwarrantable if there were not reason to believe in the reality of non-physical states of being on quite other grounds; for it is evident that the mere convincingness of an experience to him who has it is no guarantee of its genuineness. Our asylums are full of patients who are there, not because their delusions lack vividness, but because they are demonstrably non-veridical and liable to lead to anti-social results.

Fair-minded persons must admit, therefore, that, however convincing their experiences may be to them personally, they afford nothing in the way of proof which others can reasonably be expected to accept. This must continue to be the case until and unless such experiences become so common that those who do not enjoy them can fairly be regarded as in some way deficient, as are tone-deaf or colour-blind people to-day.

The foregoing comments are clearly in no way exhaustive, but they should serve to show us the kind of processes which are at work in the formation and profession of beliefs and to put us on our guard against accepting at their face value utterances which have an emotional rather than a rational origin.¹

It might well be asked why I have troubled to make these criticisms seeing that the views hitherto referred to, with the exception of agnosticism, are more or less consonant with my own. To this I would reply that I think it most undesirable that beliefs—if, indeed, they be worthy of the name—prompted by factors of the kind I have indicated should continue to take the place of such as may be determined by intelligent thought. No building can be more secure than its foundations, and those who hold even substantially correct views for the wrong reasons are necessarily living in a fool's paradise, which any chance-started thought may easily bring tumbling about their ears. Their only defence would be an impenetrable self-complacency, almost certain to be rudely shattered after death if not before, and unlikely to find much overt recommendation from anybody. It seems worth while, therefore, at any rate to invite my readers to consider the foundations of their own beliefs and at least to mention for their benefit some of the commoner varieties of false thinking which are prevalent.

¹ I make use of the emotional-rational antithesis as a matter of colloquial convenience. In strict psychology the duality disappears; but for purposes of discussion the full recognition of this would involve insufferably cumbrous locutions and I am not primarily concerned with psychological theory here.

It must not be supposed, however, that those who profess views opposed to materialism are alone in allowing their opinions to be determined by irrational factors. The position of avowed materialists is at least equally open to criticism. Quite an interesting paper might be written on the psychology of negation, although it would be unpalatable reading to modern Sadducees; but no more than a few indications can be given here.

Inertia and pusillanimity are, of course, as common determinants in this as in the opposite camp, and no profound psychological insight is necessary to trace the incredulous sneers of various grades of sensualists to a desire to be left alone in their sensualities. Clearly, also, the profession of non-materialistic views is likely to involve, if we practise what we preach, a more extensive revision of personal behaviour than most of us are prepared to undertake. And neither inconsistency between belief and conduct nor the inability to act as one knows one should are agreeable things to admit. How many of us go even so far as to say "I have been an unselfish man all my life, in theory if not in practice"?

We may also note, though we shall hardly accept, Freud's strange doctrine that "behind the pleasure principle" is to be found, deep in the subconscious, a regressive desire for annihilation—an instinctive tendency to revert to the inanimate condition. And we may at least pity the terrible pessimism which prompted the lines, surely among the most bitter ever written

*Felix conditio pecorum, brutorum,
Cadunt cum corporibus spiritus eorum!*¹

¹ Happy the lot of the beasts of the field: *their* spirits perish with their bodies!

The commonest determinant of a materialistic tendency is to be found, I suspect, in a natural and proper reaction against idealism as most usually presented. Given a reasonably active and independent mind, I can think of no better inducement to adopt an atheistic materialism than an old-fashioned religious upbringing. *Experto crede*.

To present the spiritual world in terms of fire and brimstone and streets of gold, with the Devil as a roaring lion set against an irascible Ancient whom, incompatibly, we must both fear and love, may gratify some minds; but it is well calculated to alienate the critical and the sensitive alike. Nor is the tendency reduced by compulsory church-going, moralistic tales and the arbitrary and unexplained division of natural actions into "right" and "wrong".

Even New Testament Christianity, when it is not disfigured by ugly metaphors from the abattoir and the laundry, is too often presented in a guise of objectionable mawkishness.

Mr. Hichens is very right when he makes the heroine of *The God Within Him* say: "Directly the word 'Saviour' is uttered I'm positive five people out of six think of long, fair hair, white robes, white hands, slow movements, conventional gestures of blessing, emaciation, vegetarianism and beards."

Stuff of this kind is enough to drive any sensible man to the opposite extreme. This is illogical, of course, for these *grotesqueries* have really nothing whatever to do with materialism or idealism or with Christianity or religion. But the association is so strong that comparatively few can succeed in divorcing the two sets of ideas, with the result that many potentially religious minds are irreconcilably alienated.

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The foregoing is simply a matter of straightforward if shortsighted reaction. At a slightly more recondite level, I strongly suspect that many a materialistic pronouncement is due to vanity and I cannot refrain from quoting here a delightful passage from Mr. Somerset Maugham's *Ashenden*, for it is both relevant to the issue and entertaining in itself. He says:

All sensible people know that vanity is the most devastating, the most universal and the most ineradicable of the passions which afflict the soul of man, and it is only vanity which makes him deny its power. . . . It is part and parcel of every virtue: it is the mainspring of courage and the strength of ambition; it gives constancy to the lover and endurance to the stoic; . . . it leers even cynically in the humility of the saint. You cannot escape it, and should you take pains to guard against it it will make use of those very pains to trip you up. . . . Sincerity cannot protect you from its snare nor humour from its mockery.

Of such snares one would seem to be the desire to pose as a Thinker resolute to face any conclusion to which Reason may lead. That this is the elementary duty of every philosopher I have already emphasised, but it is easy to understand how small and natural a transformation is needed to turn it into an act of heroism.

Ajax may have been imprudent to defy the lightning, but we may be sure that he felt himself rather a fine fellow in doing so. We may compare the late Mr. Robert Montgomery in a passage made famous by Lord Macaulay:

For never shall the dark-souled Atheist stand
Watching the billows breaking on the strand
And, while the Heavens tremble at his nod,
Mock the dread presence of the Awful God.¹

¹ I cannot guarantee the exact wording, but if my memory has played me false it is presumably for the better.

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In spite of the grammar we can hardly avoid a sneaking feeling that there is something rather heroic about the "dark-souled Atheist" and our instinctive reaction to those scientists who so stoically sign their own death-warrants, so to speak, is one of reluctant admiration—until it occurs to us that it makes not the smallest difference to their fate whether they sign them or not.

Another trap, baited by vanity, into which scientists are, from the very nature of their work, peculiarly liable to fall, is that of posing as infallible and omniscient. To this two factors mainly contribute. In the first place most scientists really do understand many things more fully than the layman, so that they are commonly looked up to in a way which is enjoyed by few people in other walks of life. In the second, it so happens that, within certain limits, they really are infallible; in the sense, that is to say, that two volumes of hydrogen and one of oxygen always do form water when they combine and never marmalade; burst balloons always do fall down sooner or later, instead of "climbing higher, and higher, and higher", like the Society Lady in Mr. Belloc's rhyme.

It follows that the temptation to make out that the realm in which they move with such assurance and success is the only realm there is must be very strong. Unfortunately, our scientific education, which is designed primarily for utilitarian ends, does little to inculcate a chastening humility.

It is almost superfluous to add that this tendency is the greater as the scientist concerned is less. Einstein and Bohr can afford to admit that they know practically nothing, but lesser cocks must perforce magnify their own dunghills.

In lay circles perhaps the strongest motive is fear of ridicule. Not only is a reputation for "hard common

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sense" a valuable commercial asset, but even in relatively cultured circles few people care to be thought dreamers, unpractical or inclined to far-fetched ideas. The fact that you have to go quite a long way beyond the end of your nose in order to fetch any idea worth having is not popular, for it has not been by indulging in idealistic fancies that we have made Wigan what it is to-day and generated the strange activities of Chicago.

Now, hard common sense consists for most people not so much in calling a spade a spade as in believing, if I may put it so, that it really is a spade—neither more nor less; that is to say in taking things strictly at their face value. Life is real, life is earnest, in fact, just in so far as things are treated as if they were precisely what they seem.

Any suggestion that a proper perspective might virtually transpose the illusory and the real savours of a dangerous eccentricity and to be suspected of dabbling in fanciful ideas is anathema to the plain, shrewd man.

Yet a reorientation of thought scarcely less drastic than this is necessary if materialism is to be rejected and an idealistic standpoint logically maintained.

7

I hope it will be realised that I have not written the foregoing paragraphs in a spirit of vituperation for vituperation's sake. Hard words may break no bones, but they equally cut no controversial ice and abuse, as such, weakens the case of the abuser more than that of the abused.

My object has been to emphasise the importance of the psychological soil from which expressed opinions spring and to suggest that we cannot even begin to

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discuss such a matter as this intelligently until we have forewarned and forearmed ourselves as thoroughly as possible against the fallacy of supposing that current views are the product of rational processes alone.

To do this properly would necessitate a large volume, but I hope I may have succeeded, at least in some small degree, in disturbing the complacency of those who imagine, whether as materialists or the reverse, that the whole question has so long been settled as to admit of no further discussion.

CHAPTER II

THE GENERAL CASE FOR MATERIALISM

I

THERE is but little fun, or merit either, to be had from one-sided controversy, and it is accordingly important that we should seek a proper perspective by stating the case for materialism as fairly and as forcibly as we can before attempting to demolish it.

As already indicated, he who attempts to do so is handicapped not only by the emotional dreariness of the contentions he must advance, but also by the fact that there is no positive proposition of a verifiable character in support of which he can adduce evidence. If consciousness does not survive death, it is clearly impossible to *show* that "after death there is no consciousness"; one simply cannot establish a negative of this kind. However, we must make the best we can of this unpromising situation, substituting sympathy with the materialist for enthusiasm in his cause.

2

If I were briefed as a kind of *advocatus diaboli* in this case, I think that I could best serve my client by claiming that the real strength of the materialistic position is to be found in that rule of thought known as the Law of Parsimony, or Occam's razor. This was given in the form

Praeter necessitatem entia non multiplicanda sunt

and may be translated¹—

¹ This is a very free translation to which the strict Latinist might well take exception, but I submit that "causes" is preferable to

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You must not introduce more causes (into your explanations) than are necessary (to account for the phenomena you have observed),

or more colloquially—

You must kill as many birds as possible with every stone.

That this rule is of the greatest practical importance is obvious. If for every observed phenomenon we were to postulate a separate cause, "explanation" would merely make confusion worse confounded. The essence of Newton's achievement lay in showing that very disparate phenomena—the fall of the apple and the motions of planets—could be attributed to the same cause, namely, gravitation, instead of to planetary spirits and the like presiding over the several motions.

Unscientific man was and is liable to attribute to the action of "spirits", or other vaguely transcendental causes, all kinds of natural phenomena—thunderstorms, eclipses, meteors, earthquakes, pestilences, droughts—which science has now reduced to exemplifications of comparatively few chemical and physical laws.

The argument in favour of materialism will thus run somewhat as follows:

"We scientists have, on countless occasions, shown that the spirits and other irresponsible causes, which you laymen formerly invoked to account for events, are unnecessary; thunder is not the voice of an angry god, nor the lightning his weapon; they are identical, albeit

"entities". If William of Occam (now Ockham, in Surrey) had intended to refer to *phenomenal* entities, the maxim would have been senseless, since the number of phenomena is what it is and cannot be varied by the violations of or adherence to any rule of thought whatever.

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on a larger scale, with the spark and the sputter which we can produce in the laboratory. At a less crude level, we have found that more and more bodily processes—respiration, digestion, muscular contraction—which once were so mysterious, are reducible to quite prosaic though rather complicated processes of chemistry and physics without calling in any ‘vital force’, operative *ab extra*, to their aid. Some problems are still outstanding, but this is only to be expected; we should be the last to deny that we have yet much to learn. But the fact remains that on innumerable occasions phenomena, which at first seemed inexplicable without conceding some non-physical cause, have proved amenable to treatment, and we are forced to conclude that what has happened so often before will go on happening, so that only time, intelligence and industry are needed to enable us to explain *all* phenomena in terms of a few fundamental equations. We therefore see no need for dragging in any trans-physical entities whatever. Moreover, since we can do without them, we are forbidden by the Law of Parsimony to introduce them; nor may you do so until and unless you can point to phenomena which are clearly inexplicable (not merely unexplained at the moment) by our methods. Consequently, we cannot see our way to attaching any meaning at all to such words as Soul, Mind or Spirit. If you contend that this is not the same as denying their existence, we can only reply that you are perversely attempting to draw a distinction without a difference. To say that anything exists is barren and meaningless unless you thereby imply that it plays an identifiable part in the phenomenology of the universe. It is legitimate to use fictional language and to talk as we do of Forces, for example, as existing, but only because phenomena occur *as if* there were such things as we think

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of when we use the word Force. But whereas, when men first began to study Nature, events appeared to them to take place as if they were directed by gods, spirits, demons and the like, they now increasingly appear to happen *as if* nothing of the kind were involved. And an affirmation that something exists or does not exist, or that an agency is or is not operative, is no more than an abbreviated way of summing up a consistent 'as-if-ness'. This is what we mean by denying that souls, spirits and so forth exist."

I do not, as a matter of fact, suppose that many materialistic scientists would actually summarise their negation of spirit in this form, for comparatively few are likely to be familiar with the modern theory of Fictions. But I think it approximates fairly closely to what they ought to say in order to present their case to the best advantage.

It is quite possible that the foregoing argument could be more cogently stated and, if so, I must apologise to my materialistic friends for my ineffective pleading in an unaccustomed cause. But its general tenor should be clear enough and I have little doubt that it, or something very like it, is the most valid argument there is; valid, that is to say, in the sense of being reasonable and relevant rather than in that of coercive.

Negative statements, however well founded, cannot advance the discussion at all. If an eminent biologist, anatomist or physician declares that his most careful researches do not disclose anything in the nature of "a soul", we can only reply that it would be very much stranger if they had. Except at the most puerile level of thought, we may be quite certain that, whatever it is that those who use the word "soul" refer to, it is not a thing which could be discovered by even the most

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diligent dissection. Any such form of words is accordingly almost as stupid as the old gag about the brain secreting consciousness "as the liver secretes bile".

Such pronouncements are, in the last analysis, no more than tautological. A man starts by deciding to study things of a kind which can be put into bottles and ends by deciding that "the soul" is not one of them; but unless the word is used in some quite fantastic and unusual sense, its referent has been excluded from his field of work from the moment that he circumscribed his subject.

If, as is more probable nowadays, the remark is intended to be equivalent to saying that the experimental study of behaviour does not lead us to infer the operation of non-physical determinants, very similar considerations apply at a more sophisticated level. We shall deal with this most interesting and important subject in later chapters.

3

I turn now to considerations of a different character.

Speaking generally, we may fairly say that, despite occasional protests, the whole range of once diverse sciences is being steadily subsumed under the one head of mathematical physics. This is quite in accord, not only with materialistic philosophy, but with scientific thought in general and the Law of Parsimony in particular, and I hasten to add that I welcome the tendency as heartily as the most rabid materialist could wish. It seems to me probable that the ultimate reconciliation between idealistic philosophy and mundane science will be achieved by the extension of mathematical physics (with the emphasis on *mathematical*, for which we may more

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generally read symbolistic) than by the establishment of independent autonomies.

Be this as it may, there can be no doubt that from the nature of his work the mathematical physicist is tried to "pointer readings", as Sir Arthur Eddington emphasises in his *Nature of the Physical World*. I permit myself two quotations:

Whenever we state the properties of a body in terms of physical quantities we are imparting knowledge as to the response of various metrical indicators as to its presence *and nothing more*. . . . A knowledge of the response of all kinds of objects—weighing machines and other indicators—would determine completely its relation to its environment, leaving only its inner un-get-atable nature undetermined.¹

The system of inference employed in physical investigation reduces to mathematical equations governing the symbols (used for describing the physical world, W.W.C.) and so long as we adhere to this procedure we are limited to symbols of arithmetical character appropriate to such mathematical equations. Thus there is no opportunity for acquiring by *any* physical investigation a knowledge . . . other than that which can be expressed in numerical form so as to be passed through a series of mathematical equations.²

"But", a materialistic biologist might object, "although this sounds highly transcendental and may be all very well for the physicist, I fail to see that it has much to do with me.

"Suppose that I, when I am just a little cleverer, contrive to produce living matter—a real live amoeba, say—synthetically, as I can already produce so many substances which were once ascribed to the action of a transcendental 'vital force'. I shall, of course, know all about this living matter and shall be able, with the aid

¹ *Loc. cit.*, p. 257.

² *Loc. cit.*, pp. 270-1. (My italics.)

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of my colleagues the chemist and the physicist, to reduce it to a schedule of pointer readings such as you have just mentioned. And when I can do this—I am already within sight of it—it will only be a matter of time, in principle at any rate, before I can produce the most complex living creature—even man himself—for the difference will be one of degree only and not of kind.

“Surely you would then be forced to admit my philosophical materialism, since I shall then have constructed from a schedule of pointer readings a sentient and rational being, cognisant of all those values and significances to which you idealists have attached so much importance?”

To which I answer: “My dear Mr. Frankenstein! How perfectly splendid! What fun we shall have debating whether a synthetic Bishop is eligible for the Athenaeum! Seriously, however, yours is an epoch-making discovery, but you seem to me to err, if I may say so, in your interpretation of it. What you have really succeeded in doing is to organise matter in such a fashion that—to express it in a crudely metaphorical way—Life or Consciousness can manifest in it, just as the engineer down the road has organised some other matter in such a way that I can drive it from here to Manchester. Even when you produce your laboratory man, you will only have brought your organisation to such a pitch that—to borrow the terminology of the occultists—a human ‘ego’ is able and willing to incarnate therein.

“In fact, my dear Sir, so far from establishing philosophic materialism, you have produced a most striking illustration of the Bergsonian conception of ‘life pressing against the dam of matter’. When you organised the matter comparatively slightly, as in your test-tube amoeba, you raised the sluice just a little, so to speak,

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so that a little life squeezed through; when you have organised it more elaborately and have produced your synthetic man, you will have raised the sluice much more and proportionately more life will squeeze through.”¹

The foregoing seems to constitute a perfectly good retort, though the Bergsonian conception appears to me to be no more than a convenient metaphor appropriate only to a rather low level of discourse and far removed from my own conception of the relation between consciousness and matter.

4

As a matter of fact, a very curious situation has recently arisen which cannot be altogether ignored here. Until a few years ago, unless I am greatly mistaken, biologists and materialistic philosophers alike were only too anxious to bring all the phenomena of living matter down the ladder of bio-chemistry, ordinary chemistry, physical chemistry and physics to the level at which they might be exhibited as interactions of atoms and forces or as energy transformations expressible in mathematical formulae.

At the present time a certain uneasiness seems discernible. The materialistic biologist is not quite such good friends with the physicist as he used to be, though I quite fail to see how he is to avoid turning to physics for an account of the reflex arcs and synaptic resistances to terms of which he proposes to reduce all behaviour.

The trouble seems to have arisen from the enunciation by Heisenberg, in 1927, of what is known as the Uncertainty Principle in Physics. It is alleged by some to have

¹ With acknowledgments to the late Lord Balfour.

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destroyed Determinism, reintroduced Freewill, shattered Materialism and made the world safe for Religion. I do not agree with any of this, but clearly we must devote a few paragraphs to the subject.

Roughly speaking, the Principle consists of the apparently harmless statement that it is inherently impossible (not merely impracticably difficult) to determine both the exact position and the exact velocity of any particle, an electron for example, at any given moment.

It is not difficult to illustrate this in a manner which, though technically incorrect, will at any rate give a fair idea of what is involved. Imagine that we take a snapshot of a rapidly moving object such as a driven golf ball. We shall find the ball represented on our plate by a more or less elongated streak with rather indeterminate boundaries. We can determine the mean position of the ball by locating the midpoint of the streak (allowance being made for the size of the ball), and we can find its mean velocity from the length of the streak and the time of exposure. Now, if we want to get the position very accurately, we must reduce the exposure till it is practically "instantaneous"; this will give us a beautifully clear-cut picture of the ball, but just in so far as we succeed in this we shall abolish the elongation of the image, which is essential for finding the velocity. If, on the other hand, we use a relatively long exposure so as to have a reasonably long streak to work with, the image will be so blurred that we can no longer fix its position with accuracy. What we gain on the swings we are doomed to lose on the roundabouts.

This is not at all what happens when we try to determine the position and velocity of an electron, but there is sufficient superficial resemblance to serve our purely illustrative purpose.

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The way in which philosophical conclusions are drawn from this principle is somewhat as follows:

The materialist, denying the very existence of spirit or other non-physical entities, must *a fortiori* deny them as efficient causes of phenomena. Consequently, he must maintain that the state of affairs at any given moment can be wholly accounted for, in theory at least, by the state of affairs at some preceding moment together with the laws of nature which he has discovered or may discover. But the positions and velocities of electrons are vitally important constituents of the "state of affairs" at any moment; so that if he cannot determine these his knowledge is necessarily incomplete and it is argued that, strictly speaking, he can neither predict the future nor show that the present is the inevitable outcome of the past. He is bound to fall back on probabilities and statistical laws, and this seems to introduce an element of doubt and to open the door for all kinds of deviations from strict physical causality.

Thus, it is urged, if some non-materialist claims that a given event is not the ineluctable outcome of physical law but due to supernatural intervention, the materialist cannot say him nay with all his former confidence. Whereas, previously, he would contend that the universe is, of its nature, completely describable, so that only his own theoretically remediable ignorance prevents complete prediction, he must now go further and grant that the universe is intrinsically such that it could not be completely described even by an indefinitely large number of observers armed with indefinitely delicate instruments.

I need not here elaborate the manner in which it has been sought to insert the thin end of the wedge into this joint of the materialistic harness; I am more concerned

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to emphasise that, in my judgment, idealists will be wasting their time if they seek to develop an attack on this front.

Broadly speaking, my objection is on the ground that it is legitimate to distinguish between what is actually determined and what is determinable *by us*. I do not for a moment doubt that the structure of the universe is such that we can never, however we may perfect our methods, ascertain the exact position and velocity of an electron at a given moment; but I do not think that this is equivalent to saying that it *has not*, at any moment, an exact position and an exact velocity. Sir Arthur Eddington, whose interpretations of physical principles are not lightly to be ignored, takes the opposite view and he is clearly right in warning us that we should be careful to base our theories strictly on what the nature of things does allow us to know and not on what we think we could, should, would or might know if things were other than they are or we gifted with magical powers of observation. None the less I remain unconvinced, despite the fact that the view opposed to my own can be made to carry idealistic implications.

A full discussion of Determinism would be beyond the scope of this book; my purpose here is only to indicate the kind of situation which has arisen and to express my personal conviction that the position of Materialism has not, as is so often supposed, been seriously weakened by the discovery of the Uncertainty Principle.

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of this chapter. As already observed, I do not think that the issue can be settled at this level of discussion. So far as I can see, the most that the materialistic scientists can say in this sort of argument is that, for his purposes, he can find no reason for postulating Life or Spirit or anything at all beyond his "pointer readings", while the idealist replies "Quite so. Why should you? Pointer readings comprise both your scope and your limitations; your account of the physical mechanism with which my consciousness is associated is very interesting, but it has no relevance to the question of whether consciousness, or 'being conscious' is or is not independent of that mechanism."

We have here, in fact, another example of the principle already enunciated, namely, that views are commonly adopted on grounds of emotional preference and the relevant evidence subsequently accepted or rejected accordingly.

To the man who has been trained and accustomed to regard his body as a mere limiting encumbrance and the whole of physical science as no more than the codification of a set of local bye-laws, the idea that these are ultimate realities is as laughable as is the opposite view to one brought up in the strict sect of materialistic pharisaism.

It would appear, then, that if we are reasonably honest with ourselves, a true perspective suggests that there is little to choose, so far as general considerations are concerned, between the two parties, save that the materialists are clearly handicapped by the fact that they are trying to establish a negative proposition. They are necessarily limited to argument of an inductive character, which could never be conclusive, even though the view maintained were to be correct.

At this point it might well be asked whether I propose to allow any weight whatever to the almost universal conviction, to be found at all times and among all races, to the effect that there is some kind of future life with its implication of a transcendent "spirit".

The answer is in the negative. I do not feel justified in attaching any importance at all to these facts. This is not so much on the general ground that people are "mostly fools", as Carlyle observed, and their opinions of correspondingly small weight, as because we shall not be far wrong in accepting "the wish is father to the thought" as the most important law of psychology. It is accordingly rare for a belief to be other than a wish-fulfilment. And of all events liable to arouse resentment or distress, according to temperament, the destruction of our beloved Self is the most terrible for the ordinary person to contemplate—no matter what we may say or even think that we think about it.

This is certainly true of the overwhelming majority of mankind, and, taken in conjunction with the known processes of thought formation, is sufficient, in my judgment, to account for all convictions of the kind to which I have referred.

Let it be clearly understood that I do not personally dismiss such convictions lightly as of no account. I think it probable that such "intimations of immortality" are for the most part veridical in some degree and that the great majority of religious systems, or the like, have a foundation in truth, however insecure the superstructure may be. But this is a kind of *ex post facto* judgment and I think it reasonable to suppose that, even if there were no discarnate existence of any kind, we should still find

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beliefs of the kind and intensity which we in fact observe, arising solely from a distaste for the prospect of annihilation. The existence of such beliefs is, therefore, not admissible as evidence.

7

I ought not to close this general survey of the position without devoting a few words to a matter which must already have occurred to my scientifically minded readers: I refer to the "running down of the universe" and the second law of thermodynamics.

I do not wish to go into technical details, for these would only confuse the lay reader while to others they are familiar. It will be sufficient to point out that there is a tendency for energy to pass from regions where it is highly concentrated, e.g. hot objects, and to become more uniformly distributed. This process may be taken as irreversible. Hot bottles warm chilly feet, but we can hardly imagine, nor do we observe, heat flowing in the opposite direction so that the bottles grow hotter and the feet chillier. On the grand scale the same applies to the universe, so that the total available energy is constantly becoming distributed in a less specialised and more random fashion. To this process there would appear to be a limit and when that limit is reached the universe will be "run down".

Sir James Jeans says:¹

... the general principle known as the second law of thermodynamics predicts that there can be but one end to the universe—a "heat death" in which the total energy of the universe is uniformly distributed, and all the substance of

¹ *The Mysterious Universe*, p. 13.

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the universe is at the same temperature. This temperature will be so low as to make life impossible . . . the end of the journey cannot be other than universal death.

And lest we should think that this law may be wrong, Sir Arthur Eddington tells us:¹

The law . . . holds, I think, the supreme position among the laws of Nature. If someone points out to you that your pet theory of the universe is in disagreement with Maxwell's equations—then so much the worse for Maxwell's equations. If it is found to be contradicted by observation—well, these experimentalists do bungle things sometimes. But if your theory is found to be against the second law of thermodynamics I can give you no hope; there is nothing for it but to collapse in deepest humiliation. This exaltation of the second law is not unreasonable. There are other laws which we have strong reason to believe in, and we feel that a hypothesis which violates them is highly improbable; but the improbability is vague and does not confront us as a paralysing array of figures, whereas the chance against a breach of the second law . . . can be stated in figures which are overwhelming.

On the other hand Sir Oliver Lodge gives us a ray of hope when he says:²

I claim as a physicist that too much attention has been paid to this second law of thermodynamics, and that the final and inevitable increase of entropy (broadly speaking the uniform distribution of energy referred to) to a maximum is a bugbear, an idol, to which philosophers need not bow the knee.

However this may be, it must be confessed that the idol is still pretty firmly planted on its pedestal.

Many people seem to imagine that this running down and final "death" of the universe is in some way compatible only with a materialistic philosophy. "Most men

¹ *Loc. cit.*, p. 74.

² *Nature*, 24. x. 31, p. 722.

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find the final dissolution of the universe as distasteful a thought as the dissolution of their own personality, and man's strivings after personal immortality have their macroscopic counterpart in . . . more sophisticated strivings after an imperishable universe."¹

I admit that the idea of a "cyclic" universe is very much more attractive, to me at any rate, than that of one to which one can write *Finis*—even though there may be some force in Eddington's remark that "It seems rather stupid to keep on doing the same thing over and over again". But I altogether fail to see in what respect this "running down" can be held to be inimical to the idealistic position.

Even if the universe is destined to come to a "dead end", the fact cannot involve anything more serious than that there will come a time at which consciousness can no longer manifest in matter, but, since the essence of the idealistic view is that consciousness and matter are in some sense independent, our withers are unwrung. We may fairly hope by that time to have found a more commodious habitation.

The point is, in fact, irrelevant and I mention it only lest I should be accused of a disingenuous evasion if I did not do so.

8

I feel that I should here proffer some kind of apology for the somewhat crude verbal forms which linguistic limitations have compelled me to use at intervals in the course of this chapter. In the interests of brevity and intelligibility alike I have been obliged to speak of "consciousness" almost as if it were a thing or a substance.

¹ Jeans, *The Mysterious Universe*, p. 75.

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I have spoken of consciousness manifesting in matter almost as I might speak of water permeating a sponge. I have done so with a full sense of the inadequate and even misleading character of such locutions, and at a later stage I shall try to discard such mental crutches and to explain what I conceive to be the proper way of regarding the relation between the referents of the symbols "consciousness" and "matter". It will then be realised that to convey, by the use of ordinary language, the true nature of this relationship every time it is referred to in the course of ordinary exposition would involve an intolerable prolixity. The use of figures of speech of the kind I have permitted myself is accordingly unavoidable, pending the evolution and general adoption of a special notation appropriate to the subject.

CHAPTER III

MECHANISTIC BIOLOGY: CONSCIOUSNESS AS A PUBLIC FACT

I

THE generalities discussed in the last chapter are tantamount to little more than an urgent if elaborate request that the materialistic scientist should mind his own business, coupled with a strong suggestion that this business consists only of pointer-readings and their mathematical relations and is not concerned with "consciousness", "life" or "spirit", which would be regarded as forming a distinct field—a philosophic preserve on which no poaching is tolerated.

This is quite salutary treatment for the more blatant varieties of materialist, but it is of small value save for purely polemical purposes. It may serve to score a barren debating point, but it is in no way constructive and cannot lead to anything better than an armed truce, with each side waiting for an opportunity to raid the other's territory.

It is accordingly in a spirit of sincere enquiry, rather than of dialectical intransigence, that we must meet the very formidable challenge of the mechanistic biologist, who seriously affirms that philosophy is within his preserve. His business, as he justly claims, is to study the behaviour of living matter; philosophers are specimens of living matter; philosophising is a part of their behaviour. Philosophising is therefore within the province of the biologist, who accordingly contends that when he has found out all about the conditions under which

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philosophers make the noises they do, there will be no more to be said about philosophy.

This is a very plausible contention and cannot, indeed, be formally refuted, provided due emphasis be given to the word "all" in the preceding sentence. My chief objection is that it seems a remarkably roundabout way of doing things.

Theoretically speaking, we could doubtless learn quite a lot about music by making an exhaustive study of pianolas. When we had worked out all the details of the hammer action and the pneumatic devices and what the pedals were for and the other mechanical details, we would turn our attention to the holes in the music roll and begin to ask why they are arranged in the particular patterns we find. Thus, having spent an immense amount of time over quite irrelevant mechanics, we would at last approach our main objective; but we might have saved ourselves a lot of trouble by beginning at the other end.

There is a certain resemblance here to the biologist who proposes to deal with philosophy by studying philosophers in their aspect as living organisms. Starting with the simple reactions of frogs' legs to hot water, he hopes to extend his knowledge of reflex response to stimulus situations until it includes all philosophic pronouncements. But he seems to forget that in order to account for behaviour on these lines it is above all things necessary to understand the essentials of the stimulus situation.

It is one thing to drop a philosopher into a tank of cold water and explain his reaction to sudden chill and damp; it is quite another to drop him into the universe and explain his reaction to *that*!

In fact, it would seem that, if the utterances of philo-

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sophers are to be explained in this fashion, the biologist must know to start with everything that philosophers hope one day to find out. Even on such general grounds as these, then, the biological approach to philosophy seems open to annihilative criticism.

But it would be unfair to refuse biologists a hearing on this account, for very few, I imagine, would seek to go so far as this. We must deal fairly here with the much commoner and more reasonable contention that all behaviour is completely reducible, in principle at least, to elaborations of reflex mechanisms and that Consciousness (or "being conscious"), if scientifically recognisable at all, is merely epiphenomenal—a wholly unimportant by-product.

It is true that the term "all behaviour" must include philosophising, but I imagine that biologists generally would concede, for the reasons I have given, that it is altogether outside their practical purview.

Those who hold this view would, I think, maintain that, since (as they affirm) the alleged "facts of Consciousness" may be ignored for all biological purposes, the word "conscious" has become meaningless, so that any speculations or enquiries as to conscious existence after death or apart from matter are mere beatings of the air devoid of interest or significance except as curiosities of conduct.

Of the thought of this school Professor Lancelot Hogben's *Nature of Living Matter* is so admirable an exposition that I shall take the liberty of using it as a kind of target for the purposes of this discussion. At first sight it might appear invidious to the point of discourtesy thus to single out a particular writer for criticism, but I sincerely hope that my action will not be misinterpreted in this way. The fact is that I do not know

where to turn for a better presentment of the views in question and do not wish to weaken my own case by underestimating that of my opponents. Nor am I anxious to invite a charge of disingenuous picking and choosing by citing only the less cogent arguments of inferior writers.

2

At an early stage of his work Professor Hogben takes justifiable exception to the use of words like Life, Spirit, Consciousness—particularly with capital letters—almost as if they referred to substances. In this reprehensible practice I have myself indulged on occasion in the earlier chapters of this book, and shall perforce do so again. But I have sinned wittingly and in the interests of vividness rather than of *vraisemblance*, apologising as need be for this expediential laxity.

Professor Hogben rightly observes:¹

A scientific concept is a label for a class of properties which can be investigated scientifically. Though this happens to be a cardinal doctrine of modern logicians, it is also a commonplace of scientific thought . . . which is constantly overlooked by biologists as well as laymen in a discussion concerning the nature of life. The temptation to overlook it is assisted by the custom of spelling nature and life with capital letters. . . . The only intelligible significance of the word Life in scientific discussion is to denote collectively the properties of living things. . . . To those who are accustomed to thinking in abstract nouns and capital letters this way of defining life will seem rather like the well-known definition of an arch-deacon as one who exercises archidiaconal functions; but if life is only a convenient label for the properties of living matter, we have foreshadowed an important conclusion.

¹ *Loc. cit.*, pp. 19, 20.

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This point can hardly be overemphasised; it is almost as fundamental to my own case as it is to that of Professor Hogben, though for somewhat different reasons, and is, of course, closely related to the whole question of the late lamented Universals—those “quondam denizens of the World of Pure Being” as Ogden and Richards call them.¹

Life and Consciousness have no more existence as “things” than have “redness” and “cruelty”. There are living creatures and conscious beings, just as there are red objects and cruel actions—and that is all there is to it. Unless we realise this very clearly we are apt to involve ourselves in serious difficulties, for we “can no more avoid using the word life” (and consciousness) “than the physicist can avoid using the word matter in a loose and arbitrary sense in everyday conversation”.²

We can allow ourselves the pleasure of going a good deal further than this with Professor Hogben before we come to any parting of the ways. There can be no doubt, for example, that he has the right of the argument when he takes Dr. Haldane to task for saying that to “regard persons from a purely physical and chemical point . . . is of great practical use for engineering and other purposes, *but tells us nothing, however far we may extend it, regarding the distinctive characters of conscious behaviour. . . .*” (Italics inserted.)³

Professor Hogben comments thus:

In this passage Dr. Haldane is perfectly definite in stating where, as he believes, the methods of traditional physiology cease to be applicable. It is particularly felicitous that he uses the term conscious behaviour rather than consciousness in

¹ *The Meaning of Meaning*, 3rd Edn., p. 95.

² Hogben, *loc. cit.*, p. 21.

³ *Loc cit.*, pp. 24-5.

this connection. If we find reason to believe that "conscious behaviour" can be analysed . . . by the methods of physical science, Dr. Haldane's attack on the mechanistic position falls to the ground except in so far as he can refuse to capitulate until the problem has been reduced to a question of pure physical chemistry. . . . I shall endeavour to show that in our generation the work of Pavlov's school has successfully tackled, for the first time in history, the problem of what Dr. Haldane calls "conscious behaviour" in non-teleological terms. It has reduced it to the investigation of the conditions under which new reflex systems are brought into being.¹

As rationalists we can but find Dr. Haldane's position very unsatisfactory. Even if he were to show that certain characters of "conscious behaviour" (*Mem.*: Where does he draw the line between conscious and unconscious?) really were distinctive (*Mem.*: But this only means capable of distinguishing behaviour of a conscious being from the behaviour of one which is not) his case is not advanced until and unless he shows also that these characters are, in addition to their "distinctiveness", of a kind which could not possibly be accounted for by any concatenation of conditioned reflexes however elaborate. I do not think that he has anywhere made a serious attempt formally to do this and I suspect that we have here another instance of an unprovable negative.

But Professor Hogben is no more content with scoring debating points than I am. He maintains (p. 26) that "modern biological enquiry is disintegrating consciousness into an atomic nexus of reflex arcs" and, two pages earlier, he goes so far as to deny that consciousness can properly be regarded as a scientific phenomenon at all. The suggestion that consciousness—or, more strictly, the fact of being conscious—may be a *vera causa*, or effective determinant, of behaviour, would presumably—

¹ *Loc. cit.*, p. 25.

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though he does not specifically say so—be triply anathema to him.

It is here that I reluctantly, but very definitely, part company with him.

In contradistinction to these views it will be my business, first, to show that consciousness or "being conscious" is, beyond doubt, a fact in nature with which scientists may, and indeed must, reckon, and, secondly, to indicate the lines on which a Theory of Consciousness may be developed, which shall allow full scope to this fact as relevant to variations in behaviour, without in any way conflicting with the principles or results of classical physiology.

In this chapter and the next, I shall pursue this object as far as seems practicable on what may broadly be termed the "physical" level of discussion; but in my second part I shall try to begin as it were from the other end and to work, if I may put it so, at a metaphysical level seeking to exhibit consciousness as the primary rather than the secondary reality.

3

I am anxious to concede as much to my opponents as possible. Partly for this reason and partly because it will afford a convenient pretext for the discussion of a point which ought not to remain unmentioned, I will go so far as to say that in my judgment

Conscious behaviour possesses no distinctive character whatever save that of being conscious.

Dr. Haldane's liability to attack lies in his taking such "distinctive characters" for granted; Professor Hogben's prime error in ignoring the last five words.

The point which I must deal with before proceeding further arises from the possibility, which I strongly suspect to be a fact, that both disputants are using the word "conscious" as synonymous with "voluntary". Each would probably repudiate the suggestion with scorn; but if nothing of the kind is going on, if by "consciousness" they mean no more than a non-causative epiphenomenon, I fail to see any reason for their disagreeing with each other or with me so far as I have at present gone.

An elementary analogy should serve to make the matter clear. The analogical equivalent of neither behaviourist nor vitalist will quarrel with me if I say "Black motor cars possess no distinctive character whatever save that of being black". Within the obvious limits of the analogy, the *behaviour* of black motor cars is identical with that of coloured motor cars. The statement is a truism and can be nothing more whatever way we look at it. But if I say "Driverless motor cars possess no distinctive character whatever save that of being driverless" the position is altered. The behaviour of driverless motor cars is, in certain circumstances, very different from that of cars with drivers. We may confine ourselves, if we wish, to the tautological aspect of the statement; if we do anything else it is seen to be untrue.

Now let us substitute "voluntary" for "conscious" in my dictum and see what happens:

Voluntary behaviour possesses no distinctive character whatever save that of being voluntary.

Dr. Haldane will agree with it so far as it goes, but he will regard it as a ridiculous tautology, since, he will urge, "being voluntary" makes all the difference—like "being driven". Professor Hogben will want to know what

on earth I mean by "voluntary," since, in his view, all behaviour is mechanistically determinate.

In this matter I am whole-heartedly with Professor Hogben. I do not recognise voluntary behaviour, save as a convenient fiction, any more than he does and, if I am asked what I mean by the term, I reply that I never use it in scientific contexts except, as here, for illustrative purposes. If pressed, the utmost I could concede would be to say: "Behaviour may be referred to as voluntary when it is accompanied by the illusion of being so: this illusion is commonly present when the determinants of the behaviour cannot be identified and sometimes when they can." Even so, I should be speaking only for myself—a matter of what Professor Hogben would call my "private" world.

If, like St. Peter, men take me and carry me whither I would not, my behaviour is very evidently constrained by overt causes; if, in the words of St Paul, I "give my body to be burned", my behaviour is equally constrained—by sufficient reasons, as I might call them—by a very complex conditioned reflex, as Professor Hogben would prefer to put it. To him the epiphenomenal concomitants of reflexes are of so little interest that for all scientific purposes he ignores their very existence. But the fact that I recognise them while he does not will not affect our unanimity about the determinedness of conduct.

Literally, I can scarcely understand the alternative view, which, it seems to me, cannot be more than the product of vanity. "We *know* our will is free—and there's an end of it", says Dr. Johnson, oblivious of metaphysical difficulties. "We *know* our will is *not* free", I retort from the opposite camp; "we but flatter ourselves that it is." Are we to say that we act without reason, and, if not,

do not the reasons for which we act constrain us? In what sense, then, can our will be said to be free?

But it is interesting to note, as a psychological curiosity, that one of the commonest constraints is that of talking *as if* our "will" were "free" and our behaviour "voluntary". We appear to obtain some obscure satisfaction from this—an example, perhaps, of what Vaihinger would call Thought out-growing its biological Function. But I am at a loss to discern in what way it can be held to be more dignified, or more meritorious or in any way more gratifying to be swayed by introspectively observed "reasons" than by extrospectively observed "stimuli"; or by the Laws of Pure Chance (whatever that may mean) rather than by either of these.

4

Having thus made it clear that I am not attempting surreptitiously to smuggle in the concept of "voluntary" in the guise of "conscious", but mean precisely what I say, I fully expect that Professor Hogben will concede my suggestion that the only distinctive character of conscious behaviour is that of being conscious, provided I in turn concede that it is not distinctive! This I am quite ready to do, on the understanding that there is no objection to my saying that it is for biologists in their official capacity that it fails to be so.

This looks dangerously like giving my case away, for the Professor's next move is clearly to enquire: "But if it is not distinctive for biologists, whom we have agreed are the students *par excellence* of behaviour, for whom, pray, is it distinctive?" Answer: "To those who are conscious of it. The fact that I am conscious of my behaviour distinguishes it for me; that you are so of

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yours distinguishes it for you, and so forth. Or are you never conscious of your behaviour? If you reply that you never are, all we can do is to shut up shop and go home and have tea. *Cadit quaestio*. I must find someone else to play with."

But such a reply is unlikely, and if I can wring from Professor Hogben a grudging admission that he is occasionally conscious of his actions, I can lead him several steps farther up the path.

In so doing I must take him gently but very firmly to task in connection with the most important application of his concept of "public" as contrasted with "private" worlds and the excursion into syllogistic logic on pages 23 and 24 of his book.

First, however, I must try to give a fair, if brief, account of the antinomy concerned, which I recognise as a useful addition to the apparatus of discussion.

When we are talking of the field of activity in which scientists operate we commonly speak of the "external" world. Professor Hogben wishes to substitute for this the term "*public*" world, consisting of facts and beliefs "in which we all can share", the criterion of such constituents being their "communicability". In contradistinction to this public world are many *private* worlds—yours and mine and his own and so forth—"which for the present remain impenetrable through the medium of discourse"¹. The distinction seems likely to be helpful and preferable to the former terminology.

I am not quite sure that I should care to go so far as to say with Professor Hogben that "if any fundamental distinction between mind and matter remains, that distinction henceforth defines the antinomy" just described, although, when we come to discuss "the common-sense

¹ *Loc. cit.*, p. 96.

dualism of mind and matter" in a later chapter, we shall develop a view showing a surprisingly close resemblance to this.

My contention that consciousness is a public fact is, of course, exactly what Professor Hogben most stoutly denies. Behaviour, to him, is just plain, honest, dyed-in-the-wool behaviour—he will have no truck with behaviour with trimmings such as consciousness.

His criterion of public facts is communicability and I must next make this conception clear by means of an illustration which I am sure he would approve.

Let us suppose that I have toothache. My face swells; I become irritable; I emit various noises, such as "It is painful"; extraction of the tooth reveals an abscess. These are *public* facts observable by anyone who happens to be in the neighbourhood; they are facts of behaviour. But the pain itself, if I may be allowed this form of words for a moment, is private and—ignoring the possibility of a telepathic sharing of sensations—is not communicable. If you ask me, "Does it hurt?" and I reply, "Fool! Of course it hurts—damnably!" what is public is my regretably discourteous conduct; no one on earth can say whether I am "really" suffering intensely or merely making an inordinate fuss about it.

Such inner experiences cannot in general be communicated and they constitute Professor Hogben's private worlds.

It is behaviour alone which is public and communicable, he would urge, and if of two men, each of whom has drunk a bottle of whisky the night before, one reports a "frightful head" and the other "quite all right", it is futile to try to penetrate behind this behaviour into their private worlds.

The question is whether "being conscious" is strictly

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"private" in this sense. My own view is that, although the making public of introspectively observed data may be very difficult and must always be undertaken with the greatest caution, it is not necessarily impossible. In particular the fact of being conscious is, and can be shown to be, a public fact.

It might be terminologically more accurate to say "constituent of the public world" instead of "public fact"; but this would only be to guard against anyone who might maintain that the word "fact" is equivalent to "directly observable". This would be a sterilising definition which, I am sure, Professor Hogben would be the last to countenance. He himself speaks of "common beliefs which all can share" and would presumably admit the conclusions of logical and mathematical processes as good citizens of his Republic.

5

We may now come to grips with the question of the publicity of consciousness and will begin by seeing how Professor Hogben himself deals with the matter. He says:¹

The statement "I . . . am a conscious being" has a formal relation to the statement "all men are conscious beings" like the analogous statement "Mr. Bertrand Russell is a conscious being", so long as it is understood that I and Mr. Bertrand Russell are both single valued and members of the class "men". From this it follows that any implication of the first proposition which is not implicit in the second defies logical analysis and therefore eludes philosophical enquiry. For the purpose of philosophical discussion "I am a conscious being" contains nothing that is not implied by saying that "all men are conscious beings". . . . Any residuum of the first proposition which cannot be formally identified with the third

¹ *Loc. cit.*, p. 23.

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and shown like it to be included in the second and more general proposition is a *private* affair of the individual.

This is monstrously ingenious, though we cannot help feeling that the Professor regards Consciousness as something Not Quite Nice which must be hustled off the stage as quickly as possible.

So might a Victorian governess seek to dispose of Sex. "*Women*, my dear . . . and . . . and *men*? Do you not think that it will be much better to say that they are just *persons*? I feel that when we have said that, we have said all that is *communicable* for *public* discussion: is not anything else quite a *private* affair of the *individual*?"

Seriously, however, the argument makes us wonder for a moment whether Professor Hogben has not really succeeded in eliminating consciousness from the scheme of things after all. For we have already agreed that conscious behaviour has no distinctive character save that of being conscious; and if this cannot be detected from outside, as it were, from a study of "all men", the word "conscious" appears to be superfluous and, as such, inadmissible.

Fortunately there is no real cause for alarm. The trouble is no more serious than that our distinguished author, having started from the wrong end, has not unnaturally got the answer inside out!

It is true that there is "a formal relation" between the propositions concerned, but it does not happen to be quite of the kind he supposes. He treats the situation as if what were observed, or given in experience, were the consciousness of men as a class, that is to say, as if there were a valid syllogism which ran "All men are conscious beings; I am a man; therefore I am a conscious being". This is all wrong unless we start by tacitly making the symbols "men" and "conscious beings" synonymous; in

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this case the major premise would reduce to the form "All X's are X's"—which is not helpful.

We must start at the other end with the one indisputable proposition "I am conscious" and see whether from this we can logically derive any conclusion about "all men." If we can, then it is clear that instead of saying:

Anything not implicit in the proposition "All men are conscious" is a private matter,

we must say, to the extent which our conclusion indicates,

Everything involved in the proposition "I am conscious" is a public matter.

We are so accustomed to taking the proposition "all men are conscious" for granted that we seldom if ever enquire into its credentials. Professor Hogben seems to me to have fallen into just this trap and to have produced in consequence, by a kind of circular error not easy to describe, a pseudo-demonstration that being conscious is a negligible quality of men.

6

We shall lose nothing by conceding that it is not particularly easy formally to establish the status of consciousness as a public fact.

Roughly, the argument must be on the lines "I am conscious: all men are (more or less) like me: therefore all men are conscious (more or less as I am)". But it is clear that this needs a great deal of refining before it attains anything like rigidity.

We will ignore for the moment the quantitative difficulties introduced by the words "more or less" and will take a kind of text-book analogy with a view to making the procedure simpler to follow. Let us imagine that we

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are dealing with a group of N objects—billiard balls, for example—which may be regarded as precisely similar except that they may vary in colour to the extent of being white or black (corresponding to conscious and unconscious respectively). We will begin our enquiry genuinely *a priori* so far as this point is concerned, that is to say we will suppose that we have no evidence whatever as to whether any or all of them are likely to be white or not, except that none of the qualities (such as size, density, sphericity, etc.) which has enabled them to be recognised as billiard balls is relevant to the colour question.

This complete *a priori* nescience is equivalent, in mathematical language, to saying that the *a priori* probability of any individual ball being white may have any value between 0 and 1—that is to say, in the absence of all information on the subject, the group is as likely to consist of black balls only as of white balls only or of black and white in any given proportions.

Now, if x is the *a priori* chance of any individual ball being white, then $1 - x$ is the chance of its being black (since it must be one or the other); write y for this and consider the following imaginary cases in which X refers to some individual ball:

Case A. All the balls are black.

Case B. $\frac{1}{2}$ X is black, but at least one other is white.

Case C. X only is white.

Case D. X and at least one other are white.

The probabilities of these situations obtaining can be shown to be:

Case A. Probability y^n

Case B. Probability $y(1 - y^{n-1})$

Case C. Probability $y^{n-1}(1 - y)$

Case D. Probability $(1 - y)(1 - y^{n-1})$

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But since x , and therefore y , may have any value between 0 and 1, we must integrate these probabilities between the limits $y = 0$ and $y = 1$. The results are:

$$\text{Case A. Integral } \frac{1}{n+1}$$

$$\text{Case B. Integral } \frac{n-1}{2(n+1)}$$

$$\text{Case C. Integral } \frac{1}{n(n+1)}$$

$$\text{Case D. Integral } \frac{n^2+n-2}{2n(n+1)}$$

We will now suppose that we discover that one ball (not X about which we are speculating) is white; this is equivalent to introducing the knowledge that one man is conscious, namely, myself. This discovery eliminates cases A and C from possibility and the chance that X is white becomes the ratio of the probabilities B and D,

which reduces to $\frac{n-2}{2(n+1)}$. If n be large enough this fraction approximates indefinitely closely to $\frac{1}{2}$.

By a similar calculation it can be shown that the chance of the ball actually discovered to be white being the *only* white ball in the assemblage is $1 - \frac{n-1}{n}$, which becomes indefinitely small when n is very large.¹

If we substitute "men" for "balls" and "conscious" for "white" throughout the foregoing, we arrive at this conclusion:

Starting without prepossessions of any kind and using

¹ I am indebted to my friend Mr. W. Hope-Jones, of Eton College, for the mathematical part of this argument; he must, however, be exonerated from all responsibility for its application.

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as data only the facts that I myself am a man and conscious, and that there exists a large number of other members of the class "men", I can show that the chance of my being the only conscious man is negligibly small, while the chance of *any* other man being conscious is an even chance.

7

This breaks the back of the work and there is no need for me to elaborate in detail the method whereby we can proceed to the conclusion that *all* men are conscious.

In brief it is as follows: To say that there is an even chance of any individual man being conscious is equivalent to saying that, to a very high degree of probability, half the members of any large group of men *must* be conscious. But *ad hoc* study fails to provide any basis for dividing humanity into conscious sheep and unconscious goats and, since all *may* be conscious, we are forced to the conclusion that they all are, provided they are sufficiently like me to be counted as human.¹

I submit that this procedure enables us to establish consciousness as a public fact with a certainty at least equal to that of any other which is not strictly observable.

It would appear that the only element of doubt in the treatment is that involved by the words "sufficiently like me to be counted as human". I, of course, am unique, at least in the modest sense that I am not exactly like anyone else, so that when I speak of other people being

¹ I feel I must apologise for this egotistical mode of treatment. It is inevitable, because the fact that I am conscious is the only fact of consciousness which is directly given in my own experience. Each reader will naturally take the ego-centric position for himself in considering the argument.

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“like” me I am necessarily introducing a quantitative conception. We cannot arbitrarily separate the objects concerned into “like” and “unlike”; there are innumerable degrees of likeness. I am not sure to what extent it would be practicable to make the whole argument quantitative by assigning, in some way, numerical values to the degrees of likeness between myself and other people (and animals and inanimate objects) and producing an answer in terms of the degree of resemblance between the way in which I am conscious and the way in which they are. No doubt the feat is not beyond the resources of mathematical notation, although it would certainly be an unduly artificial procedure in the present state of our knowledge. But it seems reasonable to suppose, in a general sort of way, that those who resemble me most closely in other respects will do so most closely also in the manner or degree of their consciousness. I can hardly doubt that Professor Hogben and I are more alike in the way we are conscious than either of us and a duck-billed platypus.

This is rather treacherous ground and I have ventured on to it mainly for the sake of pointing out that the argument just given not only allows but demands—as seems reasonable on general grounds—full latitude in attributing varying degrees or kinds of consciousness to beings—such as monkeys, dogs, gold-fish, worms and bricks—so unfortunate as not to resemble us so closely as we resemble each other. For many reasons, some of which will become apparent in later chapters, I should be very sorry to have to draw the line between living and non-living, conscious and non-conscious matter; or, in other words, unreservedly to deny consciousness even to stars and stones, though these will presumably be conscious in some way so far more primitive than our

own that we would not and do not usually speak or think of them as being conscious at all.

Rather than to attempt to draw hard and fast dividing lines, it seems to me much more reasonable to suppose that complexity of organisation, complexity of behaviour and order of consciousness, if I may be allowed the term, go hand in hand.

I have little doubt that in due course biochemists will bridge the gap between living and non-living matter; but I am equally confident that, when they have done so, it will not be possible to say "at this point, when we add this atom to the molecule, life appears". Similarly, I do not believe that it will ever be possible to draw a line between two groups of living creatures and say "these are conscious, those are not"; still less shall we be entitled to declare, as our forefathers presumptuously did, "these have Immortal Souls which those others lack". There is a continuity of consciousness in the universe not to be overruled by scientific nomenclature.

Anticipating a very difficult discussion, I suspect that consciousness, or being conscious, may be regarded as associated with matter in much the same way and for much the same reasons as matter itself is associated with space. We have definitely outgrown the Newtonian conception of matter inhabiting empty space which could exist just as well without it; the two are so indissolubly linked that space devoid of matter is literally meaningless. Of these two neither is afore nor after the other and it may not be wholly misleading to suggest that consciousness seems a strong candidate for the vacant place in the trinity. I hope I need hardly add that this is no more than a most tentative speculation by no means to be taken too seriously; it serves only to adumbrate conceptions which I shall later develop in a somewhat different guise.

This discussion has occupied a space which many, who would have taken its outcome for granted, may consider out of all proportion to its deserts. But taking things for granted is a most dangerous indulgence and the mere fact that a writer of Professor Hogben's calibre can seriously challenge consciousness as a scientific fact automatically invests the point with considerable importance.

The argument used was given more on account of its intrinsic interest and in order to clinch the matter beyond doubt, if possible, than because it is indispensable to my theme.

I should have been on scarcely less secure ground if I had contented myself with emphasising what I pointed out in section 5 of this chapter, namely, that the proposition "all men are conscious" is derivable only from the antecedent observation "I am conscious" and must, therefore, if it is to mean anything at all, impute to all men the same sort of consciousness that I myself possess. And it is clear that any statement about *all* anything is a public statement *de sang pur*. This would have been rather less constructive than I could wish, although I really do think that we are entitled, for once, to dismiss as incorrigible obstructionists of no importance those who would wish to deny a substantially similar type of consciousness to all men, varying as, but no more than, men vary in other respects.

Consciousness, then, is ineluctably a fact in Nature fit for scientific thinkers to deal with and no amount of neglect by them will alter it. There is, naturally, no compulsion in the matter and if Professor Hogben elects

to confine himself to his own brand of expurgated behaviourism, I can only deplore the loss of so valuable a co-worker. If he allows himself to reason about the implications of being conscious no one will be better pleased than I. But in that case I shall, for the sake of convenience, call him a philosopher—or possibly a metaphysician—just as I call him a mathematician when he is working at the statistics of heredity and an entomologist when he is classifying weevils.

CHAPTER IV

MECHANISTIC BIOLOGY (*Continued*): THE BREAKDOWN OF CLASSICAL LAW: CONSCIOUSNESS AND COMPLEXITY

I

I HAVE so far treated mechanistic biologists with a deferential generosity better justified by their personal charm than by the security of their philosophic views. It is true that I have done my best to blow sky-high the evasive suggestion that the fact of being conscious is one which scientific thought should ignore, but I have allowed to pass unchallenged, and have even tacitly approved, the breath-taking contention that the whole of behaviour is ultimately explicable in terms of no more than reflexes simple or conditioned.

This tremendous claim we must now examine, not by indulgence in obscurantist quibbles nor by propounding tricky questions of the form "How do you propose to explain such-and-such?" but by a broader mode of treatment which seems more likely to prove fruitful.

What demands attention here is not so much the substance of the claim as the fact of claiming. The general view that all events, including the behaviour of "living" organisms, is ultimately reducible to terms of physical atoms and forces is practically synonymous with philosophical materialism and coeval with philosophy itself: what really is staggering is the overweening audacity of those who maintain that this view is within measurable distance of establishment on a basis of classical physiology and modern biological experimentation. They are pre-

cisely as a child who, finding that the water six feet from the edge is only three inches deep, excitedly declares that he can lay stepping stones all the way from Folkestone to Boulogne.

I wish to drive this point home with all the force at my command and must accordingly spare no pains to make it clear.

I think it is fair to say that mechanistic biologists are the particular exponents of philosophic materialism in this sense: other varieties of scientist can talk in general terms of Matter, Energy, Forces, Laws, Equations, Determinism, and What-not; it is the biologist who, as a student of the behaviour of living organisms, is at closest grips with what we conversationally call Life, Mind, Spirit, or Consciousness in its interaction with matter. When he claims that he is well on the way—to say no more than this—to reducing what we normally call conscious behaviour to terms of physical law, we must suppose that it is in virtue of his specifically biological work that he does so and not on general grounds. There is any number of reasons whereby we may account for a biologist holding materialistic views other than biological study. Such a tendency might even be hereditary: We might say, imitating Gilbert:

For every boy and every gal ✓
Is born with a philosophic twist,
As either a little I-de-al—
Or else a little Materialist!

This is as may be. I am not particularly interested in what may have led the biologist as a private individual to espouse a materialistic creed; I am concerned only with the biological evidence which, in his professional capacity, he can adduce in favour of it.

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I contend that this evidence is not only insufficient, but grotesquely insufficient, to justify the conclusions which many biologists seek to draw from it. I base this contention not on the quality but on the quantity and order of complexity of the work which has been done; that is to say, if I may be allowed the simile, on the ratio of the area mapped to that yet to be surveyed. I regard the conclusion drawn not so much as a logical *non sequitur* as an unwarrantable extrapolation; and I suspect that the classical laws of physiology may begin to break down and prove inadequate, if and when they are applied to extremely complex forms of behaviour, in just the same way that plane geometry breaks down and proves inadequate when applied to very large areas of the earth's surface. This is no reflection on the classical laws of physiology any more than on the principles of plane geometry: it is simply a matter of how far the assumptions underlying the respective techniques are in fact true of the material to which they are applied. I need not trouble about the curvature of the earth when I am making a plan of my back garden, but I must if I am surveying India; the biologist need not worry about consciousness when he is studying a scratch reflex, but he must when and if he starts out to furnish a complete explanation of the behaviour of Mr Gandhi. The fact that he has no technique for doing so—*analogically*, that he knows nothing of spherical trigonometry—is not relevant to the contention as such.

Let us start by getting the notion of reflex action quite clear. The general idea is reasonably familiar. The knee-jerk in man, the scratch reflex in dogs, the contrac-

tion of the iris on exposure to light and other examples are well known. These are simple reflexes and if we describe them as automatic actions such that the same stimulus always produces the same response (subject to certain obvious reservations respecting fatigue) we shall have defined them sufficiently for our present purpose, particularly as we are more concerned with the "conditioned" variety. The important point to notice is that any such reflex

... is as definite and predictable a property of secular objects as is the precipitation of barium sulphate on mixing a solution of barium chloride with a solution of sodium sulphate¹

or the ringing of an electric bell when the appropriate button is pressed.

Such reactions have long been studied by physiologists, but until recently a distinction was admitted between them and so-called voluntary actions. This distinction has now vanished.

The change has been brought about mainly by the brilliant work of the Russian physiologist, Pavlov, and his school. And lest I be thought inappreciative of this work let me at once make it clear how much I admire the fertility of conception and sustained brilliance of technique which alone can make such results possible: I have done enough experimental work myself at least to form some idea of the difficulties involved. It is stupid and ungenerous ever to criticise on the grounds that finality has not been attained—unless, indeed, the person concerned has been so imprudent as to claim it. We think no less of Laplace because he did not allow for the effects of tidal friction in his celebrated demonstration of the stability of the solar system, or of Newton because

¹ Hogben, *loc. cit.*, p. 36.

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he did not introduce the "cosmic coefficient" into his law of gravitation. It is well always to remember in such connections Mr. Bernard Shaw's remark: "Shakespeare was a taller man than I—but I stand on his shoulders."

Reverting to conditioned reflexes we will again ask Professor Hogben to enlighten us. He says:¹

There is . . . no need to go into the technique which is formidable. The more significant developments of the subject may be dealt with by considering how aspects of behaviour which were formerly referred to the introspective concepts of memory, attention and sensation can now be investigated without departing from the language adopted by physiologists, when describing the properties of simple reflex action.

Pavlov's investigations commenced with the study of salivary secretion in dogs. A dog which has been deprived of the fore-brain secretes saliva, when food is introduced into the mouth. The intact animal also secretes saliva, when food is brought within the range of its eyes or nostrils. In the adult the sight or smell of food is an appropriate stimulus for reflex salivary secretion. The ringing of a bell is ordinarily without effect on the secretion of saliva; but the ringing of a bell, if repeated a certain number of times, when food is also presented, eventually comes to evoke salivary secretion, when food does not accompany it. In general it is found that, in the intact animal, a previously indifferent stimulus applied at suitable intervals simultaneously with the application of a stimulus which unconditionally evokes a reflex response is found to acquire the property of evoking the same reflex response, when unaccompanied by the original or "unconditioned" stimulus. A new reflex has been built up. Such reflexes are called by Pavlov *conditioned* reflexes, and the previously indifferent stimulus is called the conditioned stimulus.

Any event in the external world which affects a receptor organ may in the intact animal become a conditioned stimulus, provided external conditions are rigidly stan-

¹ *Loc. cit.*, pp. 43, 44.

dardised, provided also that it accompanies the unconditioned stimulus a sufficient number of times. . . .

In defining the conditions which determine the bringing into being of a new reflex system by this method, we are investigating a class of phenomena which would formerly have been attributed to "memory". At no point is it necessary to depart from the conventions of scientific nomenclature; and in place of a descriptive epithet, we arrive at a definite specification regarding when and whether an event will occur.

I do not think that the importance and extent of the field thus opened up needs any emphasis from me, particularly if due attention be paid to the remarks concerning memory, to the action of which we attribute almost the whole of our conscious behaviour.

I rather wish that Professor Hogben had dealt a little more explicitly with the mechanism invoked to explain the facts observed, for I do not feel competent to give a really satisfactory account of it in a few words. I will content myself with saying in rather amateurish language that this mechanism consists of what are known as reflex arcs. A reflex arc consists of a receptor organ—such as the retina of an eye—at one end connected by two or more nerve fibres (cells) to a motor or "executor" organ at the other. The connection may be fairly direct or exceeding roundabout. The nerve fibres are not continuous, but have junctions known as synapses, and the nervous impulse passes from one nerve cell (fibre) to another or not according to the resistance offered by the synapse. The passage of an impulse across the synapse weakens its resistance. All this is well-established anatomically and histologically. It is easy to imagine, without going into details, that there is no great difficulty in constructing out of such elements as these a kind of automatic telephone exchange of great flexibility and one, moreover,

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which will connect subscribers on a basis, *inter alia*, of the calls which have previously been made.

It is not easy to see what limit can be set to the capabilities of such a mechanism, nor do I propose to suggest that, in the ordinary sense of the term, there is any limit. But, equally, it is not easy to see what limits can be set to the application of plane geometry to terrestrial survey, nor can it properly be maintained that there are such limits. What I do say is that the enthusiast for plane geometry has no business to declare that the Earth is flat until he has carried his triangulations over its whole surface and shown that they fit. At any rate he must show that the area he has actually surveyed is so considerable a proportion of the whole that any curvature worth mentioning would show up as discrepancies not small compared with his observational errors.

This, or the analogue thereof, is precisely what I contend that the biologist has not done—or even come within one thousandth part of one per cent of measurable distance of doing.

Let us go into this matter a little farther.

3

Subsequently to the passage quoted Professor Hogben goes on to explain how one of the most important parts of Pavlov's work has been "to ascertain the conditions which *prevent* new reflex systems from coming into being, or extinguish them when they have become established". This is clearly true, otherwise we should be left quite in the dark as to how it is that an animal bombarded by a host of indifferent and unconditioned stimuli appears to *select* some rather than others for "attention". And it is perfectly fair to say: "The inhibition of conditioned

reflexes is a complex question; *and its complexity emphasises how broad a basis they offer for the interpretation of 'conscious' behaviour in general. . . .*¹ (My italics.)

I have no desire whatever to minimise the fertility of the field opened up by the conception of conditioned reflexes and their inhibition; on the contrary, I shall later be at pains to suggest that there may be a close correlation between degree of consciousness and complexity of organisation, which last may well be a matter of actual or potential reflex arcs. It is absurd to talk of limiting the scope of such a field unless we define the phrase in some rather arbitrary fashion. We do not say that there is a limit to the scope of Plane Geometry, Newtonian Mechanics or Daltonian Atomic Chemistry, for they can be successfully applied to indefinitely complicated cases within their own fields; but we do say that more generalised conceptions are necessary in order to deal with the survey of spheroidal Earths, recessive nebulae and the phenomena of radio-activity.

It is to be noted that so soon as we leave the very simplest examples of conditioned reflex we are practically obliged to abandon methodologically correct forms of description and, in the interests of brevity, to "lapse into the language of introspective psychology". Thus we should say:

A *greedy* monkey saw a curved yellow object, he *remembered* similar situations and *thought* it was a banana; he *decided* to eat it and *tried* to peel it. When he *discovered* that it was only painted tin, he jabbered with *rage*, being *unable* to *conceal* his *disappointment*.

Each of the italicised words is derived from introspective psychology and would be eliminated from the account of

¹ *Loc. cit.*, p. 45.

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the event given by the behaviourist. The fact that such an account in full would probably need many more pages than the introspectively based account needs words does not invalidate the behaviourist's contention that his is the proper way of dealing with the matter, except on occasions for which a mere suggestive shorthand will suffice.

The danger of introspectively based accounts is that we are apt to be led by them to talk and to investigate as if the words greed, rage and disappointment, deciding, trying and discovering referred to *verae causae*, which in some mysterious way could modify or override the action of the stimulus-synapse-response mechanism. This is a most fallacious way of looking at the matter, just as it would be to say that Einsteinian equations modify or override Newtonian equations: they do not; they reduce to them in special cases such that certain terms may be neglected for practical purposes.

4

Now it is easy to see that even the simple activities of the greedy monkey—consisting of a not-very-complicated visual stimulus, a dozen or so movements of the arms and hands, and a like number of facial and laryngeal, etc., contortions—are enormously more complex than the salivation of dogs or similar reactions studied by Pavlov and his followers.

I will not weary the reader by attempting to build a series of steps between a comparatively simple piece of behaviour such as that just discussed and one so complicated as the writing of this book. It should be clear that whatever be the intrinsic merits of the latter, it is, considered as a conditioned response to a stimulus situation

extended in space time, incomparably more complicated than any form of behaviour which the biologist is within sight of studying experimentally.

And when I use the word 'incomparably' I mean it as nearly literally as no matter. The difference in complexity between such a response and the salivation of a dog is so great that comparison is not so much odious as absurd.

I am not here asserting flatly that it is theoretically impossible to reduce even the most elaborate and sophisticated forms of human behaviour to terms of conditioned reflexes; I do say that the more extreme mechanistic biologists are in the position of men who have experimentally determined half a dozen points on a bit of a curve half an inch long and are laying down the law as to what the equation to that curve "must" be and as to what course it will take if produced a hundred miles beyond the determined points.

I will ask the reader to bear with one more illustration, which will serve not only to clinch the point—or so I hope—but will bring us a definite step nearer to the constructive view which I am so anxious to develop.

Let us suppose that we are astronomers investigating the motions of that erratic lady the Moon and that we begin our studies soon after Newton has enunciated his Law of Gravitation.

Now the most important determinant of the Moon's behaviour is the Earth, so we start by working out the answer we want in terms of the Moon's mass, the Earth's mass and the distance they are apart. We record this in the form of a crude simulacrum of mathematical notation by writing

$$(M) = F(E)$$

which is short for "The Moon's motion (M) is a function (F) of—that is to say, is dependent on—certain facts

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involving the Earth (E)". Observation soon shows that this is only a rough approximation to the right answer, so, remembering that although the Sun is very far off it is also very large, we investigate what effect it has and now write

$$M = F(E, S)$$

where S stands for "also certain facts concerning the Sun".

We refine our methods of observation and find that there are still discrepancies between the observed and calculated orbits. Continuing the work, we correct for the influences of Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, the deviations from sphericity of these, tidal friction and the mass of Mr. G. K. Chesterton, finally writing

$$M = F(E, S, Me, V, Ma, J, Sa, N, P, Sp, F, G.K.C., \dots)$$

prudently leaving a few dots at the end to make room for anything we may have forgotten.

If we take the various determinants in the right order we shall find, long before we have done all this, that the observed and calculated motions agree within the errors of observation. We rightly conclude that the Newtonian Law of Gravitation, if applied with sufficient thoroughness, is competent to deal with the motion of the Moon and all observable vagaries thereof. It is to be noted that no change in principle would be involved, but only an added complication, if we were to take into account each individual asteroid and all the comets.

But if we play the same game with Mercury we are forced to a quite different conclusion. The motion of Mercury, notably as regards that of its perihelion, is not

amenable to the Newtonian Law of Gravitation, no matter how industriously we may apply it. The phenomenon in question resisted all attempts at elucidation until Newton's Law of Gravitation was replaced by the more general and not-quite-identical Law given by Einstein; it was then explained both qualitatively and quantitatively.

The field opened up by the classical laws of science, notably those of Newtonian mechanics and Atomic theory, proved so fertile and the deductions which scientists were enabled to make about the physical world were so numerous and so successful that it was for long supposed that they were final laws. This supposition has now proved to be erroneous. On all sides the classical laws have been superseded by more general forms—in the realm of very great distances (receding nebulae), in the realm of very minute distances (electrons and quantum laws) and in the realm of very high velocities (mass of energy of motion).

I suggest that mechanistic biologists have been encouraged to unwarrantable extrapolation by the success of classical laws and that they have altogether failed to take warning from the supersession of these.

Professor Hogben wisely guards himself by saying: "I do not assert that all aspects of conscious behaviour will eventually be explained in terms of Pavlov's conditioned reflexes. I do affirm that Pavlov has successfully applied the methods of traditional physiology to the study of processes presumably included in Dr. Haldane's definition. . . ."¹

The position thus stated is unimpeachable, but not all biologists are so moderate and it has been necessary to deal with those who are not.

¹ *Loc. cit.*, p. 54.

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In case we do not meet Professor Hogben again in these pages, let me take this opportunity of thanking him not only for having played so accommodatingly the part of whipping boy for his associates—for in this I have given him no option—but for a most interesting and instructive book which I cordially commend to all my readers.

5

At long last we approach the crisis of this Part. We are about to attempt the formidable task of evolving something tolerably resembling a theory of consciousness *regarded from a physical standpoint*.

The italicised qualification is very important for, whether we realise it or not, it sets a limit to what we can do in the matter and forces on us the modest conception of a theory adopted in the next paragraph. There are clearly two ways of approaching this physics-consciousness problem; speaking rather colloquially, one is to try to evolve a theory of being conscious from the standpoint of physics, the other to try to evolve a theory of physics from the standpoint of being conscious. The reason why the first is bound to break down sooner or later is simply that, however much we may resent it, our standpoint irremediably *is* that of consciousness, since being conscious is the essential condition of all experience and all thinking for each of us.

I shall not be so rash as to attempt here any rigid definition of what I mean by the word Theory; it will be sufficient to say that for me it is substantially equivalent to "a useful way of thinking about . . ." and I do not think that this will outrage modern epistemologists.

It is very much more important to guard myself

against attack by making clear what I consider a theory of consciousness is not.

It is not an account of what consciousness IS.†††

In the last analysis we can never give an account of what anything is—only, I think, of how it behaves in relation to other things.

Sir Arthur Eddington brings this out clearly in an admirable passage which I must here abbreviate:¹

Descriptions of the phenomena of atomic physics have an extraordinary vividness. We see the atoms with their girdles of circulating electrons darting hither and thither, colliding and rebounding. Free electrons torn from the girdles hurry away a hundred times faster, curving sharply round the atoms with side slips and hair-breadth escapes. . . . Behind it all the quantum h regulates each change with mathematical precision. This is the sort of picture which appears to our understanding—no insubstantial pageant to fade like a dream.

The spectacle is so fascinating that we have perhaps forgotten that there was a time when we wanted to be told what an electron is. The question was never answered. No familiar conceptions can be woven round the electron. . . .

Something unknown is doing we don't know what—that is what our theory amounts to. It does not sound a particularly illuminating theory. I have read something like it elsewhere—

The slithy toves
Did gyre and gimble in the wabe.

There is the same suggestion of activity. There is the same indefiniteness as to the nature of the activity and of what it is that is acting. And yet from so unpromising a beginning we really do get somewhere. We bring into order a host of unrelated phenomena. . . .

To the qualification regarding the success of the physical theory, which Sir Arthur goes on to discuss, I shall allude later; for the moment I am content to point out that if

¹ *Loc. cit.*, pp. 290, 291.

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these things be so, as they undoubtedly are, in the realm of such comparatively tangible entities as atoms, how much more shall they be when we are dealing with something so elusive as consciousness.

6

I shall consider this modest conception of a theory to be admissible and submit that the characteristics of a satisfactory theory will be that it shall leave all explanation of behaviour to the application of classical law when the order of consciousness involved is comparatively low—e.g. salivating dogs—but at the same time, *without discontinuity*, shall admit of any required degree of deviation from those laws when the order of consciousness involved is high—e.g. Keats when he wrote the sonnet printed at the beginning of this book.

The words italicised are very important. What chiefly alarms the mechanist is the idea of an irresponsible intruder who may suddenly grasp the controls of the machine and give a disconcerting display of aerobatics before handing over again to the official pilot. And who shall blame him? But if the transition is gradual, as in the change from cases in which Newtonian mechanics are sufficient to those in which Einsteinian are necessary, I do not think he will object nearly so strongly.

The kind of way in which such a mode of regarding consciousness may be developed is best indicated by illustrations.

I referred just now to the behaviour of the planet Mercury. Unless my memory plays me false—and for the purposes of the illustration it is immaterial whether it does or not—the reason for the irregularities in question is to be found simply in the fact that it moves very fast.

One of Einstein's most striking results was the conclusion that energy has mass; a beam of light passing very near the Sun, for example, is measurably deflected, just as a rifle bullet might be. It follows that a moving object, which possesses kinetic energy or energy of motion, is more massive than the same object at rest. The effect is so small as to be of negligible importance for most practical purposes. It does not interest the aeroplane designer. At 400 m.p.h. the mass of an aeroplane weighing five tons is increased by rather less than one ten millionth part of an ounce. But it may become quite appreciable in the case of a body moving as fast as the planet Mercury and of first-rate importance when we are considering electrons shot about in evacuated tubes.

Let us by way of a preliminary trial say that consciousness may be in some sense compared to motion. A moving body does not behave quite like a stationary body when it is moving very fast ("very fast" being explained as "with a velocity comparable to that of light"); a conscious organism does not behave quite like an unconscious organism when the order of consciousness is high. We here compare "being conscious" with "moving". It is clear that to regard consciousness in such a way as this satisfies the criterion laid down at the beginning of this section; it leaves the explanation of simple behaviour of a low order of consciousness to classical law; but this will gradually cease to be sufficient as the order of consciousness becomes higher and higher. If the analogy be pressed we see that consciousness becomes the dominant factor as the limit corresponding to the velocity of light is approached; at that limit its effect would be infinite: but this is an "unwarrantable extrapolation" if ever there was one and I mention it only to titillate the fancy of the mystically minded.

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Alternatively, we may note that mass is also increased by rise in temperature, since heat is a form of energy, so that the dynamical behaviour of a very hot body will not be quite the same as that of the same body at a lower temperature.

We might allow ourselves accordingly, without running any grave risks, to hazard the conjecture that

Consciousness may play in the determination of biological behaviour a part analogous to that played by the increment of mass, with motion or temperature, in dynamical behaviour.

On no account must this be taken too literally. I most emphatically do not suggest that in any ordinary sense of the word consciousness is to be regarded as being *like* "motion" or *like* "heat". It is at least as distinct *sui generis* as are these two and the other actors in the cosmic drama. What I do suggest is that to say, "this object is very hot" or "this object is moving very fast" is tantamount to saying "this object will not conform precisely to the laws of classical dynamics"; similarly, to say "this object is highly conscious" may be tantamount to saying "this object will not conform precisely to the laws of classical physiology".

A singularly elegant parallel to the idea I wish to introduce is to be found in the theory of the Expanding Universe. I quote Sir Arthur Eddington again:¹

Einstein's law of gravitation contains a term called the "cosmical term" which is extremely small in ordinary applications to the solar system, etc., and is generally neglected. The term, however, actually represents a repulsive force directly proportional to the distance; so that however small it may be in ordinary applications, if we go to distances sufficiently great it must ultimately become important. It is

¹ *Nature*, 19. iii. 32, p. 421.

this cosmical repulsion which is, we believe, the cause of the expansion of the great system of the nebulae.

Here we have a deviation from classical law (under which, of course, nebulae would tend to move more closely together) determined by a fact having no more to do with the intrinsic nature of the matter concerned than the distance between two bits of it!

7

This last illustration is a particularly happy one, for I am very anxious to avoid any suggestion that consciousness or being conscious is a "property" of matter in at all the same sense that density, hardness, refractive index or magnetic permeability are properties of matter. It is not at all in this kind of way that I conceive of the association between matter and consciousness. If asked how I do conceive of it, I cannot give a definite answer, although I shall suggest very shortly with what it is that I conceive it may be correlated.

I am not going to embark here upon a wrangle as to how the word "property" should be defined and understood. Anyone is entitled to make any definitions of his own which he likes, provided he sticks to them when made. I will say then that when I speak of a "property" of matter in this kind of connection I mean the kind of attribute mentioned above which enables one to distinguish chalk from cheese. I shall use the word "predicate" in connection with remarks which can be made *about* matter, which have nothing to do with what kind of matter it is.

I do not think that anyone will quarrel with this distinction. Ductility, tensile strength and viscosity are

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clearly "properties"; I do not know whether anyone would wish to include temperature in this class; I think it should be considered a predicate, since it is more correct to say "this matter is hot" than to say "this matter has a temperature", but the point is of minor importance. Similarly "motion", or more correctly "is moving", is a predicate, although some quibbler may point out that motion without something to move is inconceivable, so that motion is in some sense a property "of" matter. But even the most hardened heckler will scarcely suggest that distance-from-another-bit-of-matter is anything but a predicate. And the same can be said of "arrangement".

To make assurance doubly sure I shall, if occasion demands, speak of "objective or public predicates", when talking of arrangement, distance apart, velocity, or the like, in contradistinction to "subjective or private predicates", such as beautiful, ugly, good, nice, etc., which are matters of private judgment.

To the list of public predicates thus defined, with which I am here concerned, I think I may fairly add that of being very small. Certainly classical laws break down when we begin to deal with electrons, though whether this is because they are themselves very small, or because the distances between them are very small, I am not competent to say; by analogy from the story about the "cosmical term" and the receding nebulae, I should imagine the latter to be the more probable. It is of no importance here. What is noteworthy is that we have to be unfaithful to classical law in an even more flagrant way than heretofore. Some atomic phenomena are dealt with by classical law and others by quantum law—a horrid but unavoidable inconsistency—so that, as Sir William Bragg has it, it is no overstatement to say that we use the classical theory on Mondays, Wednesdays and

Fridays, and the quantum theory on Tuesdays, Thursdays and Saturdays.

This deviation from classical law on account of size alone is perhaps the strangest thing of all I have mentioned. It is almost as if we found one point to be North of another with the unaided eye, East of it when we used a microscope and West when we used a telescope!

What I am leading up to is the very remarkable fact that it is always in connection with what I have called "public predicates" that the classical laws begin to go wrong.

Matter begins to behave oddly because, or when, it is very hot, or is moving very rapidly, or is at a very great distance from other matter, or at a very small distance. I speak subject to correction, but I do not think there is an instance of their going wrong in the kind of way we have been considering as a result of the exaggeration of any property as defined above. I know that "classical methods are inadequate and the new statistical mechanics must be used" in dealing with matter of extremely high density in white dwarf stars, but I am not sure that the breakdown is of the same kind as that which occurs in the other cases cited; it seems that it may here be "overdetermined", by atomic structure as well as by density—the latter not being responsible *per se*. I mention this purely because it suggests a rather interesting line of thought as to the possible connection between laws and, on the one hand "predicates", on the other "properties", not because it has any great relevance to the argument.

The point I am making, which seems pretty well established by what has been said, is that whenever—to speak colloquially—we are concerned with an exaggerated predicate we may expect deviation from the classical laws, which, like respectable middle-class citizens,

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are at their best only in their own walk of life; extremes of high and low society alike derange them.

In passing it seems just worth noting, rather hesitantly, that in these cases where classical laws break down through the effect, if I may put it so, of an exaggerated predicate, there is always a kind of tripartite relationship between the predicate, some correlate thereof and the final result.

I do not want this to be taken too seriously, but it is at least suggestive to exhibit it in the following form:

<i>Predicate</i>	<i>Correlate</i>	<i>Result</i>
High temperature	Increment of mass	Non-classical behaviour
High velocity	Increment of mass	Non-classical behaviour
Great distances	Repulsive force	Non-classical behaviour
Small distances	Quantum effects	Non-classical behaviour

I suggest that

Consciousness is a correlate of some public predicate of a kind which when exaggerated may lead to detectably non-classical behaviour in the biological domain.

8

To complete the job, so far as I am prepared to take it for the moment, we must look round to see whether we can find some public predicate with which we can plausibly correlate consciousness.

I think that we can. It is *Complexity*—complexity of organisation in full, plain complexity for short.

Amplifying the remark just made, I accordingly suggest that

Consciousness is a correlate of that public predicate known as complexity of organisation.

We may add that there will be a deviation of behaviour

from that deducible from classical law positively correlated with the complexity of the organisation and with the corresponding order or degree of consciousness.

I think it possible that this is as near as we shall ever get to saying what consciousness IS.

I hope I need hardly say that I advance this suggestion with very considerable diffidence. Presented as above, in the context of what led up to it, it sounds, I trust, tolerably plausible; whereas the isolated proposition that so utter an abstraction as "complexity" can as such be an effective determinant in the behaviour of material objects might well appear preposterous. To this I would reply that complexity is no more abstract than distance or, indeed, than velocity; more strictly, in all three cases we obtain the abstraction only by abstracting, from the total situations of moving, separated or complexly organised matter, the matter which moves, is separated or is complexly organised. This is not nearly so abstruse as it sounds; the appearance of difficulty arises solely from our slavish acquiescence in linguistic conventions, which encourage us to believe that the words we use necessarily have objective referents. This is not true. Distance, without two bits of matter to be distant one from the other is meaningless—literally so, for once; the same is true of Velocity without a moving object. And I suspect that it is also true of Heat without any object to be hot, although it somehow seems more legitimate to think of thermal energy wandering unattached through empty space; but empty space again is a meaningless if convenient abstraction and it may be that to talk of thermal energy therein is equally so.

The only difference I can see is that, whereas distance and velocity have long been recognised as things to be

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dealt with, and enjoy a very elaborate notational technique evolved for the purpose, practically nothing of the kind has been done in the case of complexity; but this disability is the misfortune, not the fault of my theory and should not prove impossible to remedy.

I contend, therefore, that complexity is precisely on a par with distance or velocity and every whit as competent as these to cause deviations from classical law.

9

We must now try to decide what is to be understood by the word "complexity".

Following a well-tried procedure we will begin by discussing various things which are not to be understood by it.

First and most obvious of these is mere size. Consider a block of truly homogeneous matter, ignoring, for the moment, the fact that all matter actually consists of atoms, etc. By definition this block has no sort of structure; it follows that it can have no organisation, no complexity and—according to me—no consciousness. Which is what one would expect. The same applies no matter how large it is, provided we go on assuming that it is homogeneous; clearly there will be in general, if we do not, more scope for complex organisation in a large object than in a small one.

The same applies if we cut the block in half; two unconscious blocks are no more entertaining than one, as frequenters of any good club can testify. Division and organisation are not synonymous. It would seem therefore that mere numerousness, *per se*, is no guarantee of complexity. This is so clear to me that I fear it may not be so to others; let me anticipate therefore by saying that,

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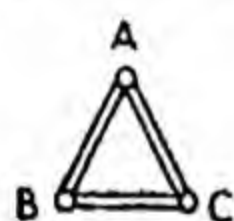
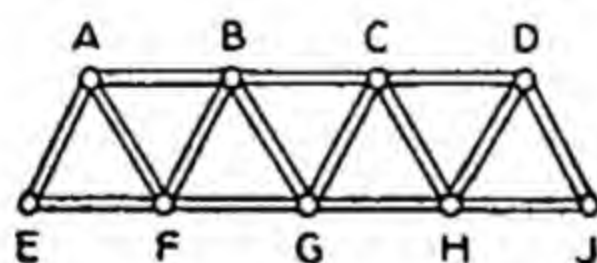
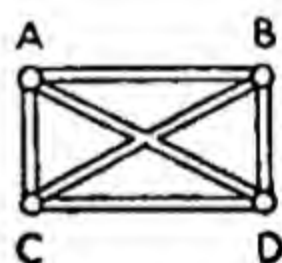
to me, the essential feature of complexity is the possibility of interaction between parts—the existence not only of distinguishable entities but of some linkage between them.

I accordingly dismiss also Arrangement as having, in itself alone, anything to do with complexity. It may and constantly does facilitate the making of the interconnections on which organisation depends, but cannot of itself create them. It is, however, worthy of a few passing words. Consider the four small circles *A*, *B*, *C* and *D* of Fig. I, which we may suppose to be cells located in an approximation to one-dimensional space:



FIG. I

it is evident that they can only be connected in the manner shown, namely, *A* to *B*, *B* to *C*, *C* to *D*, because we cannot go outside the "space" assumed in order to connect *A* to *C* or *B* to *D* directly. In two-dimensional space we can satisfactorily connect three such cells but not more (Fig. II*a*). Here the three cells *A*, *B* and *C* are satisfactorily

FIG. II*a*FIG. II*b*FIG. II*c*

connected in the sense in which I use the term, each being connected directly and unambiguously to each of the others. More cells may, of course, be introduced and connected up after a fashion as in Fig. II*b* and an indefinitely large network can be constructed in this way. But no cell is directly connected to all the others nor can be directly connected, in such a network, to more than

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six. If we try to secure complete connection of each cell to every other, as in Fig. IIc, the connections must cross and, since they cannot be taken one over the other—because the space is only two dimensional—an ambiguity arises of a kind fatal to good organisation; a prisoner from cell *A*, for example, starting in the direction of *D*, might turn aside half-way and go to *B* or *C*. It follows that the complete organisation of more than three units demands space of three dimensions.

The use of the foregoing remarks is mainly to make clear what I mean by “direct and unambiguous connection”. Two other ideas must be introduced in order to complete what I may call the skeleton of complexity, or what I might provisionally and not very happily describe as the complexity of discrete entities.

The first is that there must be some sort of difference between the cells and the connections; otherwise there is no more organisation than in rabbit-wire or the sides of a meat safe. The phrase “holes held together by string” is good Irish for a net but fails to suggest organisation, despite the reliance of Whitehall on red tape. I do not think that a mile of tangled string should be considered as more complex in its organisation than the same string untangled.

The second is that we must suppose some sort of action or impulse or the like to be propagated along the connections; otherwise the cells are just isolated cells without any complexity of organisation at all.

I want it to be clearly understood that this is very elementary and very tentative. It is not intended as a rigorous treatment of what I mean by complexity but as a set of illustrative remarks, of which the object is to indicate the kind of thing I have in my mind when I use the word.

One very evident difficulty must be mentioned at once. I have spoken, for the sake of clearness, of "direct and unambiguous" connection. What are we to do when the connection is neither of these in the sense in which I have used the words and yet there is clearly interaction between distinguishable entities? For example, are we to say that a congeries of electrically charged particles, of which each is distinct and yet indubitably acts on all the rest, is to be considered as lacking complexity of the kind I wish to explain? My own answer is in the affirmative; I consider that such a congeries does lack the kind of complexity of organisation which I have in mind. The process of interconnection has been overdone so that indiscriminate-ness results.

But this is clearly a not very difficult matter of technique and I will venture to pass it over with no more than the suggestive remark that the number of ways in which n things can be chosen from a total of N is a maximum when $N = 2n$. After all, my business here is to indicate a possible theory in outline not to develop and apply it in detail.

10

Please turn back to the quotation from Sir Arthur Eddington, which adorns page 107. We have been encouraged by the remark:

And yet from so unpromising a beginning we really do get somewhere. We bring into order a host of unrelated phenomena . . .

He goes on:

. . . we make predictions and our predictions come off. The reason—the sole reason—for this progress is that our description is not limited to unknown agents executing unknown activities, but *numbers* are scattered freely through the

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description. To contemplate electrons circulating in the atom carries us no farther; but by contemplating eight circulating electrons in one atom and seven circulating electrons in another we begin to realise the difference between oxygen and nitrogen. . . . Out of the numbers proceeds that harmony of natural law which it is the aim of science to disclose.

Now I should not care to be compelled to defend the view that no theory is worth considering unless it is of a kind which lends itself to numerical statement or deals in metrical attributes, for numbers are not the only symbols which can be unambiguously handled according to fixed rules so as to yield reliable conclusions. None the less the history of scientific thought certainly shows that theories which lend themselves to mathematical treatment are far more likely to lead to useful results than those which do not; and it will be remembered that I started by saying that to me a theory—I might have said a good theory—is a useful way of thinking about things.

I think we might go so far as to say that we are justified in regarding with some suspicion any theory which is clearly, from its intrinsic nature, necessarily devoid of numerical, metrical or quantitative features of any kind.

Fortunately the theory here outlined, although I see no way of bringing it into immediate subjection to mathematics, is not so badly off as all this.

We have complexity at one end as it were, consciousness in the middle and behaviour at the other end. All three may fairly be regarded as quantitatively expressible in one way or another.

Complexity clearly is of a nature to lend itself very easily to numerical expression. If, for example, we were to decide to define the complexity of a system as the number of connections which have been established between the constituent elements of it, it is clear that

this is numerical and has a maximum possible value of $N(N-1)$, where N is the number of constituents, or $N(N-1)/2$ if we consider that connecting A to B is the same as connecting B to A .

It is interesting and suggestive to note that in actual three-dimensional systems, such as brains, such complete connection of every element with every other could scarcely be regarded as even theoretically possible, since the connectors themselves take up a certain amount of space. In practice, therefore, we are likely to have to consider the ways in which groups of n_1 , n_2 , n_3 , etc., elements may come to be associated or connected together and so forth. Is it, I ask myself, a mere coincidence that any theoretical treatment of complexity is clearly going to smell so very strongly of those Permutations and Combinations which lie at the root of the mathematical theory of Probability—of Probability which increasingly dominates scientific thought? A rhetorical question requiring no answer, but none the less suggestive.

Of consciousness itself we have already seen, in the course of the argument on pages 63-4, that it must be regarded as varying in degree in some fashion or other. It may, of course, vary in several independent ways at once, just as "colour" may vary in respect of hue, luminosity and saturation; if so it will not be less metrical but only rather more difficult to deal with. It is moreover clear that, unless we adopt a sterilisingly solipsistic attitude, we shall almost certainly be able to agree on some kind of a grading of conscious beings, even if we cannot attach a numerical tag to each; and if we can do this and can also grade the differences we are very close to actual measurement, as Brown and Thomson emphasise in their *Elements of Mental Measurement* (pp. 11-12).

For myself, I suspect that the danger and difficulty

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lies rather in the opposite direction; that is to say, in insisting in attaching numbers—in the ordinary arithmetical sense—to entities to which they do not happen to be applicable, but which are none the worse for that.

Dirac, for example, deals freely with what are known as “*q*-numbers” which do not obey the laws of arithmetic and ordinary people would not call numbers at all; from these our old friends are evolved, I gather, as special cases. We must surely agree with Sir Arthur Eddington when he says:¹

I venture to think that there is an idea implied in Dirac’s treatment which may have great philosophical significance. . . . The idea is that in digging deeper and deeper into that which lies at the base of physical phenomena we must be prepared to come to entities which, like many things in our conscious experience, are not measurable by numbers in any way; and further it suggests how exact science, that is to say the science of phenomena correlated to measure-numbers, can be founded on such a basis.

I sincerely hope that this may prove a prophecy as well as an opinion. Treatment *à la* Dirac is far more likely to prove fruitful, where consciousness is concerned, than any attempt to force the subject into an arithmetical framework which it does not necessarily fit.

As regards behaviour we can say at least that its mathematical expression will be no less difficult for mechanistic biologists than for those who espouse some such theory as that which I have put forward. Actually it is likely to resist treatment more stubbornly than either complexity or consciousness. It is fairly easy if we are considering so simple a matter as salivation, for this phenomenon can be completely described in such terms as the moment at which the secretion begins, the rate at which it takes

¹ *Loc. cit.*, pp. 208–9.

place, its chemical composition and the variation of this with time. To express the production of a Shakespearean sonnet, or the inevitable precision of a Holbein profile, in terms of muscular contraction deducible from a knowledge of conditioning stimuli, seems to me to be a hopeless task. Such phenomena are likely to remain for ever unpredictable on any theory whatsoever; but this is not to say that they are undetermined.

Behaviour, in so far as it is measurable at all for any practical purpose, is likely to prove so mainly in terms of probability. We are unlikely ever to be able to write a mathematical expression for a piece of behaviour, so to speak, but we may be able to describe it as lying within certain defined limits and to estimate the probability of an event occurring within the limits defined.

The foregoing should serve to justify the contention that the theory I have adumbrated is by no means to be ruled out of court on the ground that it is insusceptible of mathematical treatment, although it is within neither my purpose nor my ability to undertake such treatment here.

II

I have not yet given any formal definition of complexity and as I have failed hitherto to find one altogether to my liking I shall not attempt to do so. But if we keep the idea of interconnection of parts without indiscriminate-ness well in the forefront of our minds, we shall be able to talk about it without much risk of being led seriously astray. I think it worth while to devote a few lines to considering the kind of things which seem to me to be complex or otherwise within my understanding of the term.

I do not regard a ball of iron or a heap of sand as

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particularly complex, although the former consists of innumerable molecules and the latter of very many particles, which may be regarded as in some sense interconnected. The feature which I have described as indiscriminateness seems excessive in these cases, nor is there any kind of flux going on, which I suspect is more or less essential to actual—as opposed to potential—complexity. The same applies to a thing like a rubber sponge, though if we made sure that all the holes were interconnected and filled it with some suitable fluid we should begin to approximate to complexity in my sense. Nor do I suppose that stars are very complex in my sense. I speak subject to correction from astrophysicists, but I doubt whether the structure of a star is any more complex than that of an orange, or as much so, although it contains enormously more protons and electrons. So far as the possession of reasonably discrete and interrelated parts is concerned I suspect that the Earth is more complex than Sirius and an acorn than either.

As a matter of purely historical interest, I did not, so far as I can introspectively determine, select complexity and fiddle about evading definition of it, because I wanted to drag in brains and the organisation of nervous systems; I chose it because I could not think of any other public predicate at all capable of filling the bill except Arrangement, which I rejected on the ground that it seems in practice to be closely associated with crystals but not with highly conscious organisms. But it more or less leaps to the eyes that nervous systems are the type *par excellence* of complexity as I have tried to explain it. I have evaded definition for the very simple reason that I cannot think of one which will arrange magnets, stars, acorns and the contents of my own skull in a convincing order.

I am inclined to believe that the excogitation of such

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a definition is the first step to be taken towards making the theory propounded capable of practical application. But, as I have said before, such application is outside the scope of the present work.

There is no surer way of damning a theory from the start than by claiming too much for it and this error at least I can avoid.

Let it be understood, therefore, that the view here suggested does not profess to enable us to solve, in a direct and incontestable manner, all the problems which obscure phenomena present. All I dare claim for it is that the considerations adduced make it legitimate for us to think of what we call consciousness playing a part in the determination of behaviour, without outraging the laws of classical physiology any more than relativity theory can properly be said to outrage the laws of classical mechanics. And I will go so far as to hazard that the way in which I have suggested that it may play this part is paralleled by certain aspects of relativity theory itself.

If this claim be allowed, it follows that phenomena which are apparently inexplicable by classical law are not to be rejected on that account alone; in other words, the probability against their occurrence derived from contextual considerations vanishes.

Incidentally, the effects ascribed to complexity seem to afford the only rational ground for supposing that the Whole is other than the sum of its Parts; this may be relevant to the doctrine of Holism.

I am inclined to think that this is as far as we can take our enquiry on the physical level. We have succeeded in

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developing conceptions at least suggestive of a point of view far removed from the crude interactionism which is the best that most anti-materialists can compass; but there is still much to be done, for our work has been largely destructive and a far more drastic revision of our thought is needed before we really see light. We shall be obliged to make a determined effort to lift the whole discussion to a higher level and to indulge extensively in what Professor Osborne Reynolds once modestly described as "An Inversion of Ideas regarding the Structure of the Universe."

PART II

CHAPTER V

THE CONSCIOUSNESS-MATTER ANTITHESIS: DUALITY AS A FICTION

I

HITHERTO we have taken our pastime in comparatively shallow waters. It is true that we have occasionally dabbled in matters, such as the recession of nebulae and incremental mass, not to be found in the *Child's Guide to Knowledge* and have had need to breast one or two waves of pure abstraction. But I think we have all been able to keep at least one foot on the bottom, even if it has involved associating chance with the bookie and complexity with the tote.

We must now prepare to plunge resolutely into the depths of metaphysics, regardless of whether we have received any formal instruction in that "systematic misuse of technical terms specially invented for the purpose". After all, as James pertinently observed, metaphysics is only the name we give to an unusually determined attempt to think clearly;¹ or, adapting Oscar Wilde, we may conclude that the function of Metaphysics is to teach Philosophy her proper place.

2

My first task must be to anticipate one very obvious criticism, which will otherwise be brought against the theory propounded in the preceding chapter.

¹ If pressed on the point, I should say that for me Metaphysics coincide very approximately with what Dr. Broad calls "Critical Philosophy" (*Scientific Thought*, pp. 18-22) and Philosophy with what he describes as the speculative branch thereof.

Unwary critics will be almost certain to object that, by associating consciousness with complexity of (material) organisation, I have tacitly given away my whole case; since, if the organisation be broken up, as by the death of the organism, the complexity vanishes and consciousness with it. How then, it will be asked, can consciousness possibly be held to be transcendent to matter, or even independent of it? The distinction between properties and predicates, it will be urged, is a mere disingenuous sophistry, whereby it is sought to invest consciousness with a false odour of non-material sanctity. Actually, it will be pointed out, complexity without matter is as senseless as space, or distance, or velocity, without matter, so that consciousness must be—on the complexity theory—as dependent on matter as any of these.

This is a very tempting line of attack and would be fatal *if I had asserted an identity between consciousness and complexity*. But I was careful to do nothing of the kind: I suggested a correlation.¹ The attack is therefore irrelevant and void. I took the precaution of saying at the outset of my search for a theory that I did not propose to say what consciousness is and the fact that I actually used the phrase “consciousness is a correlate . . .” was a mere concession to convenience of grammatical structure. To have said “There exists a correlation between consciousness and . . . etc.”, might, perhaps, have been better from the point of view of pure pedantry, but it would have been less effective as an expository remark.

But although the attack is futile, as thus stated, and easily repulsed, it might well be renewed in another and more dangerous form. The fact that I asserted no more

¹ A correlation may be defined as a “tendency to concomitant variation”. (Brown and Thomson, *loc. cit.*, p. 97, though I do not care much for the teleological flavour of “tendency”.)

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than a correlation might be admitted, but it might then be urged that this was merely a dodge for disguising the fact that consciousness is *caused by* complexity and must perish with it. J. S. Mill, for instance, affirms that "Whatever phenomenon varies in any manner, whenever another phenomenon varies in a particular manner, is either a cause or an effect of that phenomenon, or is connected with it through some fact of causation."¹ I should be sorry to have to dispute this, except on the lines indicated in the note; but the last few words render it nugatory for our present situation.

Sometimes it appears easy to say which correlate is the cause of the other; more often we can ascribe both to a common cause, as the increase in the purity of the air and in the price of Bass as we go up in the world. Even this might not be altogether simple to expand in full and it is still more difficult, perhaps, in such a case as the negative correlation between the percentage of calcium in people's bones and the number of living aunts they have. It is easy to understand that the longer a man lives the more calcium will be deposited as insoluble salts in his bones, while the fewer aunts will be likely to be surviving him. But the calcium does no harm to the aunts, nor do they make testamentary depositions of it in their nephews; and it is rather a strain to invoke Time as a causal agent determining both phenomena.

At any rate it is clear that causation of one phenomenon (e.g. consciousness) by another (e.g. complexity)

¹ If this were a text-book of metaphysics, I should devote more than a note to pointing out that this is probably the most magnificent example of logical hysteron-proteron in the history of human thought. Very little reflection should be required to see that "causal" is the label which we tie round the neck of the relation existing between certain phenomena which we observe to be correlated.

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is not deducible from the existence of a correlation between them.

This again might be readily conceded by critics, who would then bring forward the much more serious objection that I have almost implied causation, or at least rendered it highly probable, by my reliance on analogy with the effects of public predicates other than complexity. The incremental mass, they would say, is not identical with the velocity, but it is caused by it; the recession of nebulae is not identical with the distance between them, but it results from it. If there is no velocity there is no incremental mass; if there is no excessive distance there is no recession; surely, then, if there is no complexity there can be no consciousness. A shrewd thrust this and none too easy to parry.

There are, of course, numerous shifts and evasions which I might essay. The easiest, perhaps, would be to reply "Quite right: no complexity, no consciousness—in the *physical world*; consciousness manifests by virtue of complexity, but it is not created by it". Another, almost equally inviting, would be to take the line "There is much force in your contention, but analogies must not be pressed too far; I think I am entitled to claim a unique and privileged position for consciousness, inasmuch as it is only by virtue of it that we know anything at all; it must not therefore be treated as of the same lowly status as mass and movement, for in some sense it is clearly superior to both or to anything whatever in the physical category".

Now, as a matter of fact, I think that there is a great deal of truth in both these retorts, although I am not proposing to rely on them either singly or in combination.

When I have spoken of complexity it has been to material complexity that I have referred, and when I

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have talked of a high order of consciousness being associated with deviation from classical laws of behaviour I have been thinking of material behaviour as studied by physics and biology. It would therefore be quite legitimate, I think, to qualify the remarks I have made by some such words as "so far as its manifestation in the physical world is concerned . . ."

But I should not care to do this, fair though the qualification might be, mainly because I want to go to the very bottom of the matter, but also because it would inevitably suggest a transmissive theory of consciousness, which I am most anxious to avoid.

I say "suggest" advisedly rather than "involves", for it does not seem to be beyond the powers of ingenuity to involve a non-transmissive theory on this basis. I could, for example, argue that complexity is responsible, on the lines discussed, for the deviations from classical behaviour which may accompany a high order of consciousness and that, in some rather occult fashion, consciousness happens to associate itself with complexity. It would be very difficult to drive me from such a position, but it seems to involve a discontinuity as repugnant to me as I am sure it would be to others.

3

But I do not think that argumentation on either of these lines is the proper way of solving our problems. Very much more drastic methods are called for if real progress is to be achieved. Let us grasp the nettle and, instead of repudiating the analogies, boldly challenge the causation.

I have already indicated my views on causation, albeit only in a footnote, and I do not think it necessary to

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expand or defend them fully here. Causation, causality and similar conceptions are, in my view, fictional constructs in the sense in which the word fiction is used by Vaihinger and by myself later in this chapter. The words are no more than labels—albeit extraordinarily useful labels—used for identifying certain relations between point-events fixedly located in the four-dimensional space-time continuum.

I could accordingly repel criticism of the kind we are considering by contending that the word "cause" is senseless as commonly used, but I prefer to do it on a rather less recondite level. I submit that even if we understand the words in the usual loose way, according to which the cause is regarded as being in some fashion superior to or more important than the effect, there is no justification whatever for saying that the recession of nebulae is *caused by* the distance between them, or that the incremental mass is *caused by* the velocity: similarly we have no right whatever to say that consciousness is caused by complexity of organisation.

I want to get this very clear, so a short digression is desirable, although we shall not go further here into the general theory of causation.

In the ordinary way, when we speak of event A causing event B, rather than of B causing A, we do so because A precedes B in time and we cannot conceive of an effect being antecedent to its cause. Certainly it is only the order in which events appear in consciousness which enables us to distinguish between cause and effect. It would be perfectly easy to devise a cinematograph film which would "make sense" whichever way it was run and primary physical law, as Eddington points out, is quite indifferent to whether we run the cosmic film forwards or backwards. It is only Entropy which kindly provides

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“Time’s Arrow”—to use the same writer’s vivid phrase—to tell us which end is which. And even this throws no light on causation beyond enabling us to decide which events are to be labelled causes and which effects according to the conventional code.

But in the distance-recession and velocity-incremental mass relationships there is not even this feature of order in time to confuse the issue. If ever we may legitimately speak of simultaneity it is in such connections as these. In no sense and for no observer does the distance precede the recession or the velocity the increase of mass.

The equation relevant to the latter phenomena is very simple. It is

$$M_v = M_o / (1 - v^2/c^2)^{\frac{1}{2}}$$

or $M_v - M_o = I = M_o \{1 - 1/(1 - v^2/c^2)^{\frac{1}{2}}\}$

where M_o is the mass of the object when at rest.

M_v is the mass of the object when moving with velocity v .

I is the increment of mass.

c is the velocity of light, *in vacuo*.

Thus written it inevitably suggests that the increment of mass is caused by the velocity. But it is equally legitimate to effect a simple transformation and write

$$v = c(M_v^2 - M_o^2)^{\frac{1}{2}}/M_o$$

in which case there is a similar suggestion that the velocity is dependent on the mass and caused by it.

Now, I want to make it perfectly clear that I am not claiming, as classical idealists and some vitalists might, that, so far from complexity of organisation being the cause of consciousness, consciousness is to be regarded as the cause of complexity of organisation. We must, at

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all costs, rid ourselves both of the idea that complexity comes first and extrudes, or manufactures or even attracts consciousness and of the idea that consciousness is there first and somehow gets to work on matter so as to bring about complexity. I am asserting that there is no causal connection whatever between the two any more than there is between velocity and increment of mass. It is a mere geometrical accident, so to speak, which forces us to write or speak one word before the other and thereby invest it with a false air of causativeness. The relation itself contains no more causal implications as ordinarily understood than the statement that Edinburgh is 396 miles North of London.

It is clear that no criticism framed on the lines that I have represented consciousness as a derivative of matter can hold good. I shall enter shortly upon the very important question of how, and in what sense—if any—I conceive consciousness and matter to “interact”.

Before doing so, however, there is one more aspect of this problem of consciousness on which I feel that I ought to touch.

4

I have been careful to say that I do not think it legitimate to regard consciousness as being in any way *like* mass or force, except in so far as it may be related to complexity of organisation in the same sort of way that these are related to velocity and distance apart respectively. That is to say, the analogies I have used have been between the relations and not between the relata. It seems worth while saying a little more about this, while we are so close to the subject, even though it is not indispensable to my main argument.

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In considering the public predicates other than complexity, which I have mentioned, we have seen that each is correlated with a physical entity of some kind; with force in the case of very large distances, with mass in the case of very high velocity and with quanta in the case of very small distances. Now these three are about as dissimilar as any three things can well be; but they are alike in this, that each can be assigned what the mathematical physicist calls—rather unfortunately—“dimensions”. The word as used in this sense has nothing to do with size, as when we talk about the dimensions of a room, nor even with those spoken of in connection with space. The word refers to the fundamental entities, if I may so term them for the moment, of which all physical quantities are, as it were, compounded. Of such, three are recognised, namely, Length, Mass and Time, although it seems likely (*vide infra*) that they will not much longer be regarded as fundamental. In terms of these we can express the general character, so to speak, of the various quantities we deal with in physics. Thus velocity, which means the distance covered per unit of time,¹ has the dimensions L/T and acceleration, which is the increment of velocity per unit of time² has the dimensions L/T^2 , and so forth.

Now the three correlates of public predicates which we have considered all have dimensions in this sense and so have the predicates themselves. Incremental Mass has, obviously, simply the dimension M , Repulsive Force has the dimensions ML/T^2 , while a Quantum has the dimensions of Action, namely, ML^2/T . The enthusiast for analogical purism will naturally enquire whether I

¹ Strictly, “the time rate of change of displacement”.

² Strictly, “the time rate of change of velocity”.

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suppose that consciousness has dimensions in this sense and, if so, what I imagine them to be.

The answer is very emphatically in the negative; so much so that if I thought that my theory were likely to lead to tying any dimensional label of this kind round consciousness' neck I should feel inclined instantly to abandon it. Fortunately there seems little danger of this. I have not been able to find a definition of complexity to my liking, but it is safe to prophesy that when we have done so it will not mention Mass, or Distance or Time. The complexity of a telephone exchange—the best analogue I can think of—is not defined by the weight of wire used, or its length or even by the time taken to put a call through, although each of these might—on certain assumptions—give a useful measure of it. Any definition must clearly be couched in such terms as the number of subscribers and the number of ways in which they can be interconnected. Analogous definition of complexity in general can only result, I think, in it being measured by a pure number; and a number has no dimensions. If complexity turns out to be in the nature of a length, or of work, or of velocity I shall be very much surprised and not a little alarmed for the fate of my nurseling.

5

But to say that consciousness has no dimensions in this sense is merely to say that neither mass, nor time, nor distance enters into its composition, so to speak; it is not equivalent to saying that it has "no reality" or is "a pure abstraction" in the sense that number is usually regarded as a pure abstraction without reality. The following observations seem relevant to this point.

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Let us turn again to Sir Arthur Eddington's so often quoted work, Chapter XI, "World Building". In this chapter, which is too difficult to compress and too long to quote extensively, we are introduced to the process whereby the specialised properties of the physical world are, in some sort, derived from raw material so un-specialised as "relata", "relations" and "some kind of relation of likeness between some of the relations". From this exceedingly general material, handled on the basis of a four-fold ordering—which happens to give the best results—it is found possible to evolve 256 numerical coefficients, thus building "a quantitative study of diversity on a definition of similarity".

Of the subsequent use of these derivatives Sir Arthur says:¹

The 256 measures of structure . . . are somewhat reduced in number when duplicates are omitted; but even so they include a great deal of useless lumber which we do not require for the building (i.e. the physical world). That seems to have worried a number of the most eminent physicists; but I do not quite see why. Ultimately it is the mind that decides what is lumber—which part of our building will shadow the things of common experience and which has no such counterpart. . . . I do not agree with those who think it a blemish on the theory that the lumber should ever have appeared in it.

By adding together certain of the measure of structure in a symmetrical manner and by ignoring others we reduce the really important numbers to 16.

From ten of these are derived Geometry (which includes space and time) and Mechanics, from the other six Electromagnetism. Atomicity, quanta and the like cannot be so derived, which suggests that the process needs modification or further generalisation in some way.

Now what interests us here is not the material that

¹ P. 235.

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is kept and used, but the lumber which is discarded; or, more accurately, the fact that there is lumber to discard.

If I had more than the dimmest inkling of how this obviously fascinating game is played, I might feel tempted to take a hand in it. As it is I will only suggest the possibility that the discarded lumber is not really useless, but that we do not know quite what we ought to build out of it. If we had lived all our lives in a land of sledges we might wonder what the wheels in the Meccano box are for. May it not be that we do not use all the available material simply because we are deliberately limiting our efforts to the construction of the physical world?

I am most anxious not to suggest, as some might, that we could construct consciousness itself out of the stones which the builders have rejected. For reasons which will be apparent only at the close of this discussion, I think it more likely that consciousness is to be regarded as the whole outfit, so to speak—and possibly some more into the bargain—than as a derivative construct of any part of it. I hazard the suggestion that the “lumber” not yet used may come in handy when we come to extend our building operations beyond the confines of the physical world—for relations of some kind must always be involved—and I venture to affirm that our inability to construct consciousness out of the same materials that we use for Geometry, Mechanics and Electromagnetism is no reason for saying that it is in any sense less “real” than they.

6

We must now tackle what I conceive to be the crucial point of my whole discussion. We must deal with the question, which has surely been haunting my readers throughout this chapter and the last, of how—if at all—

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consciousness is to be conceived of as "manifesting in" or "interacting with" matter. We have come within hailing distance of this problem several times, but I have always and designedly shied away from it, contenting myself with expressing a distaste for transmissive theories, gratuitous and discontinuous parallelisms and all birds of like feather.

Let us get the difficulty clear. In ordinary language it is this: If consciousness is sufficiently like matter to interact with it and to influence its behaviour, it must be material enough to be perishable; if it is so unlike it as to be imperishable, it cannot be like enough to influence its behaviour or to interact with it.

It may be objected that this is a very misleading way of putting it, and that by using this form of words I am only setting up a dummy in order that I may pat myself on the back when I have knocked it down again. This is fair enough, except that it is not I who have set up the dummy. The whole problem is a dummy set up by materialists, who have crossed fictions with facts and worshipped the resultant spawn.

In the everyday language in which I have just stated the difficulty, the word "consciousness" is used as if it referred to some kind of a stuff, like matter only less so, whereas only the most antiquated vitalists of the lower sort think of the problem in such terms. But, as a matter of fact, we do not advance appreciably by re-wording the sentence in terms of "the property (or quality, or attribute, or predicate) of being conscious" instead of using the word "consciousness". It comes to just the same in the end to say that if the property of being conscious is to be reckoned with in studying the behaviour of matter it must be as dependent on it as the properties of being viscous or heavy, or magnetic; and that if it

is not it cannot be concerned in the determination of that behaviour.

Unfortunately, the falsity of the problem seems never to have been fully realised by those who have dealt with it, so that the history of the subject consists of vitalists and their associates trying to have it both ways and the materialists insisting that they cannot. For once the materialists have been right: you cannot have it both ways.

But I seem to have heard of a very similar *impasse* before, in connection with energy and mass.¹ Einstein dispelled this difficulty, not by explaining how mass and energy interacted, but by showing that there was not, as had been formerly supposed, any fundamental distinction between the two. There is only one Einstein, but lesser men can have the sense to take a tip from the winning stable.

Accordingly, I do not propose to explain how matter and consciousness interact; I propose to show—as I hinted at the outset of this work—that the problem does not exist and that what has been considered to be one is an unreasoned, if natural, artifact.

Not all philosophers, perhaps very few, will agree with me; but unanimous accord between philosophers would be—to borrow a phrase from Sir Arthur Eddington again—“something much worse than a violation of an ordinary law of nature, namely, an improbable coincidence”.

But it can scarcely be gainsaid, as a preliminary proposition, that the existence of the problem is wholly dependent on the assumption that there really is an antithesis between matter on the one hand and consciousness on the other; if we destroy the antithesis the problem disappears.

¹ Cf., p. 36 above.

I propose to submit the view that the antithesis is a pure fiction, possessing an admitted utilitarian value, but not to be maintained as an hypothesis and still less as a fact.

7

It is no part of the plan of this book to give an account of the general Theory of Fictions, for to do so would be both impracticable and unnecessary. Interested readers should consult H. Vaihinger's important work *The Philosophy of "As If"*.¹

I think we can sufficiently indicate the nature of a fiction, as Vaihinger uses the word, by means of a rough process of definition and the aid of one or two illustrations.

It will be convenient to begin by thinking of a fiction as being (not a lie, but) a "provisional auxiliary construct" used as a tool, or as a scaffolding, to facilitate the processes of thought, and destined to be discarded when the work is done. The use of a fiction is characterised by our treating the problem or situation *as if* some proposition were true which (sometimes obviously) is not. Thus, on his own showing, Professor Hogben's book is a blind, non-purposive reaction to a complexus of conditioned stimuli in space-time showing no characteristics of conscious behaviour; but, for the sake of utility and courtesy alike, we find it more convenient to treat it *as if* it were a deliberate and well reasoned attempt to enlighten the public. In this case it all depends upon the point of view which way of regarding the situation should be regarded as fictional and which as factual. Inasmuch as my opinions diverge from those

¹ In Messrs. Kegan Paul's *International Library of Psychology, Philosophy and Scientific Method*.

held by Professor Hogben, my account of the matter is likely to be more flattering than his own.

A fiction differs from an hypothesis, which is also provisional and also often discarded, by the consideration that the latter is intended, when first formulated, to be tested by experience and finally consolidated as a fact, if found satisfactory; whereas the fiction, when consciously used, is always destined for the scrap heap so soon as it shall have served its purpose. By no means all fictions are recognised as such, however, and an enormous amount of needless trouble arises from their being promulgated as dogmas, exalted into theories and accepted as facts. Our antithesis is probably the most remarkable example of this confusion.

Vaihinger cites innumerable instances, explicitly recognising some thirty varieties in the domains of Aesthetics, Ethics, Law, Mathematics, Religion, Science and so forth.

As a classical example he constantly refers to the mathematical method of treating curved lines *as if* they consisted of an indefinitely large number of indefinitely short straight lines. He says:¹

... fictions have been more and more used in recent mathematics. Their most famous and most fertile application was in the measurement of curves by Descartes, Leibniz and Newton. This is really the classical example. By means of the fiction of coordinates, of artificial lines (all artificial lines are fictional methods), and by means of differentials or fluxions, a treatment of curves became possible.

Other examples are, The Average Man, Liberty, Infinity, Ideals, The Absolute, Quasi-contracts; but particularly, for our purpose, the *Ding an sich* or Thing-in-itself. Vaihinger characterises this, rightly, I think, as "the most brilliant of all conceptual instruments", though

¹ *Loc. cit.*, p. 148.

when he claims (p. 74) that "Kant is the originator of this concept" I suspect that he errs, although Kant may have been the first definitely to formulate the conception and, partially at least, to recognise its fictional character. Vaihinger (*ibid.*) says that in the first edition of the *Critique of Pure Reason* it is called in one place "a mere idea", i.e. a fiction, but stresses the point that "the ambiguity that Kant developed in connection with this concept was due essentially to his . . . wavering between the *Ding an sich* as an hypothesis or a fiction". But surely every man who ever talked about the properties of an object tacitly assumed the existence of a thing-in-itself apart from those properties and used the fiction for the purpose of his discourse or reasoning.

8

This question of *Dingen an sich*, or Things-in-themselves is all-important. The fiction concerned is so deep-rooted that I cannot expect all readers fully to realise the point I am about to make, but I think I can force an intellectual assent by means of a simple illustration.

Let us consider that familiar object the Moon, with special reference to two of its most important activities, namely, shining and causing tides.

In everyday language we say that "The Moon shines" or "The Moon causes tides". If we want to be a little more accurate we say "The Moon reflects light from the Sun, thereby presenting a radiant appearance" or "The Moon exerts a gravitational pull on the water, thereby . . . etc." More accurately still we say that from time to time we have sensory experiences which we describe as "observing the Moon", "observing the Tides" and "observing a correlation between these observations".

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The important point is that sensations (or sense-data, or sensa, or presentations, or modulations of consciousness, or whatever you like to call them) are alone directly experienced¹—NOT the Moon itself. The same is true of any other properties or activities you like to mention. What then are we to understand by "the Moon itself"?

Behold, I show you a mystery: *There isn't any "Moon itself"!*

This statement will come as a shock to many, who will instantly react with expressions of incredulity and derision. But it is startling only because of its novelty and extreme simplicity. Those who have not been exposed too long to lunar influence will assent in due course.

"The Moon" is no more than a fictional peg devised for the convenient hanging up of properties and activities.

But to say this is not to deny the practical value of the peg. On the contrary it would be very difficult, for many purposes, to get along without it, as will be realised by considering what we should otherwise do if we were asked to "explain" the observed correlation between the rise and fall of tides and the variation of bright patches in the night sky. Would we say that the brightness "caused" the tides, or the tides the brightness?

But what is true of "the Moon" is true also of all other "objects".

We say "This bit of matter is Square, Blue, Hard, Cold, Polished, Silent, Brilliant and Valuable—I call it a Sapphire"; or, "This bit of matter is Elongated, Pink, Soft, Warm, Coarse, Vocal, Dull and Worthless—I call it a Philosopher". In each case the words "this bit of matter" might just as well be replaced by "X" or any

¹ Even this will require some modification at a later stage.

other mark we choose to make on the paper. Such words are forced on us solely by the exigencies of grammar and serve no purpose whatever save as pegs on which to hang the various descriptive words. They are of no use except to introduce these just as in proletarian English the commonest adjective serves only to signal the approach of a noun.¹

The late Lord Salisbury wittily observed that the Ether was no more than "the nominative of the verb to undulate"; we may almost extend the remark to saying that Matter is no more than the nominative of all other verbs.

We shall, of course, continue to use the fiction of Matter as a *Ding an sich* as an instrument of thought indispensable for most practical purposes; but we must realise clearly that Matter as a real substratum of properties, a *causa causans* of experience, has vanished never to return.

9

It follows that all problems arising, directly or indirectly, from the antithesis of Consciousness (or anything else) and Matter automatically vanish. In particular the problem of whether consciousness can survive the dissolution of the non-existent does not arise.

Henceforward, work in this field will not consist in attempting to explain how consciousness interacts with, or manifests or is incarnate *in* Matter; but in the observation, codification and disentanglement of its phenomena in general as is done with those specialised groups known as heat, magnetism, electricity, gravitation and

¹ Less familiar to my readers, but essentially the same in function, is the comparable use of the capital letter in German.

the like. Above all we must seek to elucidate the formal relations which exist between the phenomena of consciousness as ordinarily understood (strictly, all phenomena are phenomena of consciousness) and those of other fields of enquiry. For this two things are likely to be necessary, namely, First the establishing of a point of common contact, such as I have suggested may be found in "complexity" and, Second, the devising of a suitable system of symbolic notation, which has proved an indispensable prerequisite of progress in other studies.

It should be easy to understand now that with the vanishing of Matter-in-itself from the scene, and with it the Matter—Consciousness antithesis, all similar or related antitheses totter also to their fall. In particular, the duality of "self" and "not-self" is rendered very insecure; but we shall be in a better position to deal with this when we have discussed certain important facts dealt with in the next chapter.

10

I hope, but doubt, that I have made the main point of this difficult chapter clear. Let me recapitulate briefly.

I have contended, first, that I have in no wise handed over consciousness (better "being conscious") as a bond-slave to matter by correlating it with complexity of organisation. The complexity—consciousness relationship, like the analogous distance-repulsion and velocity—incremental mass relationships, contains no feature of sequence such as characterises those relations commonly known as causal. I have further supported the legitimacy of my suggestion by pointing out that it is not invalidated, but rather the reverse, by the fact that we fail to assign "dimensions" to consciousness. The raw material of bare

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relata, relations and relation-likeness, out of which the physical world can be so largely constructed, leaves plenty of bricks available for building other things—even consciousness—should we at any time decide that the material is suitable.

I next attack the fundamental antithesis between consciousness and matter on the ground that it is altogether false; matter is demonstrably a “fiction”, a very useful one, which has enabled us to bring much order into chaos, but not on that account to be taken as a fact, or retained when it can no longer serve a purpose. This being so, we neither need nor sensibly can occupy ourselves with the question of how consciousness can interact with matter and yet be transcendent to it.

This does not exhibit matter as an aspect or product of consciousness any more than it exhibits consciousness as an aspect or product of matter. Matter, as a thing-in-itself, drops out of all fundamental discussion for ever, and we are left with the task of determining the formal relations which exist between the general phenomenon of being conscious and those subsidiary phenomena which we are accustomed to describe as the “external world”. We must, however, in any treatment which we may attempt, somehow contrive to give adequate recognition to the fact that being conscious is a necessary prerequisite to knowing any phenomenon at all.

II

The last thing I want to do is to claim any kind of completeness for the view put forward. It does seem, however, to offer a certain scope for development.

Of its shortcomings and incompleteness I am only too acutely aware, and I shall count myself fortunate indeed

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if my effort succeeds in arousing the interest of others more capable of developing it than I; and doubly so if, as Professor Bohr puts it, it does "the utmost that any theory can do, namely, to be instrumental in suggesting and guiding new developments beyond its original scope".

What I venture to claim that I have achieved is to have routed for ever that breed of materialist who contends that classical law must necessarily be competent to explain all conscious behaviour, and that interaction between transcendent consciousness and material organisms is unimaginable.

But there are many who are characterised by that bull-dog tenacity which was the despair of the French general whose name I have forgotten:

I turned their flank; I pierced their centre; they were everywhere broken and the day was mine. But they didn't know it and wouldn't run.

That's the spirit! Wherever should we be without it? Where indeed!

CHAPTER VI

THE FICTIONAL STATUS OF THE PHYSICAL WORLD

I

THE shrewd reader will already have perceived that the position reached in the last chapter is not without its difficulties and invites the posing of many conundrums with which critics have teased idealists since the days of Berkeley at least.

I do not think it necessary fully to anticipate such criticism here, for to do so would involve a very difficult, very elaborate and very tedious dissertation on the fundamental principles of psychology and allied sciences, which would be out of all proportion to the rest of the book. It seems sufficient, therefore, to confine myself to emphasising the ultimate incontrovertibility of the attitude adopted and to showing that it is not at all so preposterous as it may have appeared at first sight.

After all, this book does not purport to be an exhaustive technical treatise on the *Grundlagen* of the Moral Sciences; it is intended as a tolerably straightforward statement of why Materialism is untenable as a philosophic creed. Consequently, if we succeed in reaching a position which really is incontrovertible, it does seem legitimate to take, within reasonable limits, the line that any view incompatible with this position must be wrong—and to leave it at that.

Now, it does appear to me absolutely indefeasible that, to use ordinary language, all that we know at first hand is the varying and diversified content of our own con-

sciousness, all other alleged knowledge being derivative in one way or another. I myself should prefer to use rather less colloquial wording and to say that "modulations of consciousness constitute the whole of reality" or something very like this; but fully to explain and justify such phraseology would take us too far: it will suffice to remark here that whereas William James successfully insisted long ago¹ that "the passing thought" is "the only Thinker which the facts require", we must go further and add that it is also the only thing thought of.

Material objects and the physical world in general are not ultimate realities; they are derivative—one might almost say extrapolatory—fictional constructs. Or, if you prefer it, these words are labels attached to groups of consciousness-modulations between the constituents of which certain ascertainable relations hold. Fully to state what the relations are which lead us to use these labels would be exceedingly laborious; I can only drop an inadequate hint here. We *see* a pond (visual and maybe ocular-motor sensations); we *walk* into it (kinaesthetic sensations from our leg muscles, pressure sensations from our feet, etc., etc.); we get *wet* (tactile sensations and sensations of cold); we decide that it is a "real" or material pond. But if the first and second groups of sensations (i.e. modulations of consciousness) are not followed by the third we decide that it is not a "real" pond but a mirage. It is easy enough to think of visual and auditory sensations as "mere" modulations of consciousness and experiences of pain, warmth and cold, smell and taste are assigned to the same category without much difficulty; but kinaesthetic and allied sensations on which our ideas of space and of movement depend

¹ *Principles of Psychology*, 1st Edn., I, pp. 369 and 401.

are not so easily recognised as of the same order, while touch and pressure from which we mainly derive our notions of the substantiality of matter are—in my own case at least—definitely refractory. Yet our judgment as to whether a given experience is concerned with a material object or not (i.e. the label we elect to attach to the group of consciousness-modulations in question) depends entirely on whether certain specifiable relations do or do not obtain between such distinguishable modulations as those mentioned. The fact that it would be very laborious to give a full description of any event in these terms does not invalidate the contention that, for each one of us, all experience is completely reducible on these lines to modulations of consciousness of one kind and another.

I fail to see how anyone can evade this view however much he may wriggle, and I therefore do not think it worth while to embark upon long discussions as to “the existence of matter” or how it is that, although material objects “exist only in our minds”, clocks contrive to go on going on even when no one is perceiving them. We need only say that, for all practical and most theoretical purposes, material objects are to be regarded as existing in the ordinary common sense, dualistic significance of the words; it is only when we are working at the high level necessary for consideration of the matter-consciousness (or “matter-mind”) antithesis that we need to abandon the everyday point of view: and the quality of permanence, if I may so describe it, which enables unobserved clocks to tick, is only a name for a particular set of formal relations between certain groups of consciousness-modulations.

I should like to make it clear that I have every sympathy with those who find it impossible to eliminate "things-in-themselves" and autonomously existing material objects from their thought. I cannot do so myself, save in a purely intellectual fashion. That is to say, I find it easy and indeed imperative to yield intellectual assent to the proposition that the *Ding an sich* is only a fictional peg with no real significance, and I find this brilliantly illuminating in a number of ways; but I find also that it is extraordinarily difficult for me to unhitch the clothes from the peg and deal with them tidily without it. To know intellectually and to realise intimately are very different things—the passage from the one state to the other is probably the most important stage in enlightenment—but our sad inability to realise, or, as some would call it to "feel", need not prevent us from using our intellects to avoid tangling ourselves in non-existent problems.

To suggest that material objects have no independent existence in their own right, so to speak, is undoubtedly repugnant to common sense; but so are a number of other conclusions to which unprejudiced thinking leads us. Common sense assures me that the earth is flat and my table substantial; the suggestions that the former is a slightly deformed ball and the latter "mostly emptiness" are outrageous—but we accept them nevertheless, albeit few may "realise" them in the sense indicated above. Science, by which I here mean no more than impartial observation and hard thinking, is constantly outraging common sense and is, indeed, scarcely interesting or important except when it does so.

But the repudiation of things-in-themselves is not really

at all so revolutionary as it sounds. Apart from the fact that very similar positions have been reached and defended by a fair number of thinkers from at least the days of Berkeley and Hume, it has been tacitly assumed throughout mathematical physics since that science first began. Mathematical physicists, of course, are only human and in ordinary conversation or when playing golf use, like other men, language directly implying the autonomous existence of material objects. But such expressions never appear in their mathematical work, which is concerned only with the formal relations obtaining between metrical quantities, *alias* "pointer readings". We find symbols referring to the mass, velocity, density, etc., "of" a golf ball or other "body", and these alone enter into the equations of motion or what-not; the body itself invariably disappears as soon as the serious work begins and, logically, serves only as a convenient label for identifying which particular schedule of pointer readings is under consideration.

Model-making physics, if I may so term it, such as presented us with a world of billiard-ball atoms embedded in a gelatinous ether, is fast passing away, and it may be doubted whether it ever served any very useful purpose other than providing mental footholds for the weaker brethren. Physics, in fact, abandoned the *Ding an sich* as soon as it began to walk; so that mathematical physicists, at any rate, if they wish to quarrel with me in this matter, must start by disowning the characteristic principle of their trade.

None the less the model-making tendency dies so hard that we find a physicist of the calibre of Professor C. G. Darwin writing in an exegetical work:¹

¹ I quote from *Nature*, 6. viii. 32, in which his book *The New Conceptions of Matter* is reviewed.

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The new discoveries which I am to describe were only begun five years ago and so it is hardly surprising that they are still partly covered with the scaffolding of mathematical formalism. But I hope to show that the time has already come, when it is possible to free the structure from a good deal of this scaffolding and so to gain something of an intuitive view of what the universe is really like.

It is clear enough from this that Professor Darwin's conception of the universe is much more mechanistic than mathematical. His idea, I think, would be to give us a complete exposition of the nature of matter and of physical phenomena generally in terms of clearly imaginable objects as nearly like those of common experience as possible; that is to say, he is convinced that there somehow or other exists, behind the veils of mathematical formalism, a "real" world of substantial things and that it is the duty of physics to find out what they are like.

This is admittedly the attitude which characterised the great scientists of the last century; but it seems to me—and I believe the view to be held by the majority of physicists to-day—that the centre of gravity is rapidly shifting, so that "reality" is thought of less and less as something concrete behind the pointer readings and their mathematical transformations and more and more (in necessary consequence of this) as something inextricably bound up with consciousness itself, of which the readings and transformations are descriptive statements. The whilom concrete "realities" are seen as fictions—provisional auxiliary constructs—used simply for pegging out, as it were, the relational nexus developed.

By a happy coincidence I find, in the same issue of *Nature* (p. 209), an account of a lecture by Sir J. J. Thomson entitled "Atoms and Electrons" in which he develops a Granular Theory of Matter.

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In it he describes how a certain discovery had led him to the theory that matter was composed of "... granules of mass μ , less than 3×10^{-27} gm., all moving with the speed of light, the force on any granule being always at right angles to its path and producing therefore no change in the energy of the granule. When lines of electric force connecting protons and electrons link these granules together, the combination constitutes matter, and the mass of the proton or electron is the sum of the masses of the granules gripped by its lines of force, and the energy the sum of their energies".

Now, it is not Sir Joseph's business as a physicist to trouble himself with the metaphysical status of the concepts he sees fit to introduce in the course of his researches and I daresay he has never bothered his head about Fictions. But I am pretty sure he would be the first to warn eager students against taking his theory too literally. If he were pressed on whether he believes that matter is "really" composed of "... granules . . . all moving with the speed of light . . . and . . . gripped by . . . lines of force", he would, I surmise, reply cautiously to the effect: "It all depends on what you mean by 'really': the suppositions in question seem consistent with the facts as embodied in the relevant equations: the phenomena occur *as if* these things were so: the theory accordingly provides an imaginable sub-structure for what has been observed: *idcirco genueram.*"

From my point of view, it is, of course, an admirable example of the way in which a mechanism, in itself rather far-fetched, is invoked to provide a more or less comprehensible—I might almost say tangible—construct to support our thought. It is fairly easy to visualise numerous small granules darting rapidly about and entangling from time to time in cobweb strands stretched

between centres labelled *P* and *E*, and in this way we can form as it were a map in which to locate the mathematical symbols we manipulate. But I very much doubt whether anyone will suppose in these days that the granules have a concrete objective existence in anything like the same sense as that attributable to rifle bullets traversing a barbed-wire entanglement.

3

Let us return to the consideration of the fictional status of "external physical reality" in general.

For this purpose it will be convenient to take as a text a passage from Professor Broad's *Scientific Thought*, which appears to me singularly illuminating. The context is that Professor Broad is dealing with the nature and properties of "sensa", and in particular with the question "How are Sensa related to Physical Objects?" in the course of "an attempt to formulate clearly, in terms of the Sensum Theory of sensible appearance, the view about the external world which has been at the back of the scientific mind since the time of Descartes and Locke."

Reminding us that he has "already asserted that it is false psychologically to say that we, in fact, reach our perceptual judgments about the physical world by a process of inference from our sensa and their properties", he goes on to say:¹

Further, it is false logically to suppose that the *existence* of a physical world in general could be inferred from the existence of our sensa, or from anything that we know about their intrinsic properties or their mutual relations. I suppose that the existence of sensa is a necessary condition, but it is cer-

¹ *Loc. cit.*, pp. 267-9.

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tainly not a sufficient condition, of my belief in the existence of the physical world. If there were no sensible appearances to me, I suppose that I should not judge there to be any physical reality. But, on the other hand, there is nothing in my *sensa* to force me logically to the conclusion that there must be something beyond them, having the constitutive properties of physical objects. The belief that our *sensa* are appearances of something more permanent and complex than themselves seems to be primitive, and to arise inevitably in us with the sensing of the *sensa*. It is not reached by inference, *and could not logically be justified by inference.* (Italics inserted.) On the other hand, there is no possibility of either refuting it logically, or of getting rid of it, or—so far as I can see—of coordinating the facts without it.

There are groupings among my own *sensa* and correlations between my *sensa* and those of others which fit in extremely well with the belief in a physical world of which all the *sensa* are so many appearances. It might be held that this at least forms the basis of a logical argument in inverse probability, to show that the belief in a physical world is highly probable. But the snag here is that all such arguments only serve to multiply the antecedent probability of a proposition, and, unless we have reason to suppose that this probability starts with a finite magnitude, they lead us nowhere. Now, although I do not know of any reason antecedently against the existence of a physical world, I also know of no antecedent reason for it. So its antecedent probability seems quite indeterminate. . . .

. . . We can say . . . of the belief in a physical world, that we all do believe [in it] in practice, that there is no positive reason against [it], and that we cannot get on without assuming [it]. But, having said so much, we shall do wisely to change the subject and talk about the weather.

We shall not then attempt to prove the existence of a world of entities having the constitutive properties of physical objects; for, if this can be done, I at any rate do not know how to do it.

I shall not waste much time here in discussing whether Dr. Broad's "*sensa*" are identical with my "*modulations of consciousness*", as some passages of his book seem to

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imply, or whether, as others suggest, they are better regarded as "provisional auxiliary constructs" (i.e. fictions) set as intermediaries, so to speak, between consciousness and the physical world. I am inclined to suspect that they play both parts, but this is immaterial for our present purpose.

What is important is the lucent honesty—all too rare in philosophical writings—with which the status of the physical world is exhibited. It is *not* logically inferable from the "sensible appearances" we know at first hand; *it is an assumption which we make* because it is useful for the purposes of thought. This is exactly what is meant by a fiction as I understand it, and Professor Broad's account shows most admirably just how and why the fiction is created and what its scope and limitations are.

4

Particularly fortunate is the observation that belief in a physical world is "primitive". Actually, it is not, perhaps, quite so primitive as he thinks; for there seems to be some reason for supposing that in very primitive types indeed—young children, certain savages, regressed psychopaths—there is a tendency to confuse the "imaginary" or "visionary" with what we should ordinarily call "the real". In other words, a certain degree of sophistication is needed even to get so far as creating the fictional construct. This is very insecure ground, however, for the nature of such cases renders good introspective corroboration almost impossible to obtain, and it is clearly a point on which the behaviourists can throw no light, however successfully Dr. J. B. Watson¹ "builds up fear" in babies.

¹ Late of Johns Hopkins University.

But this is only of academic interest here, for there can be no doubt that the belief in question is, as Dr. Broad maintains, primitive as compared with the highly sophisticated level at which the matter-consciousness antithesis must be discussed.

It is, of course, exactly this primitive, naïve, common-sense view which I am here concerned to attack, or rather to supersede—not for general purposes, but for our particular purpose as students of the credentials of materialism as a philosophic creed. The last four words are important, provided “creed” be used in a sufficiently wide sense, for against materialism as a working hypothesis for engineers and chemists in their professional capacity there is nothing to be said. It is only from a standpoint approximating closely to ultimate analysis that materialism appears as no more than “a provisionally permissible, methodologically necessary, auxiliary idea with no real validity”.¹

5

The following remarks culled from Herr Vaihinger's important work should serve to clinch the point we have been considering. In a section headed “Matter and Materialism as Mental Accessories”, he speaks (p. 199) of materialism as “another one-sided abstraction whose influence has been incalculable”, and continues

... indeed the whole method of the natural sciences, which are founded on the assumption of an independent external world, is only a one-sided abstraction. This is what Lange meant when he constantly stressed the methodological

¹ Vaihinger. *The Philosophy of “As If”*, p. xix; but I do not know whether he or Mr. C. K. Ogden, the Editor and translator, is to be credited with this pearl of verbiage.

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validity of materialism, but dwelt with equal emphasis on its metaphysical (or rather epistemological) invalidity. The materialistic conception of the world is a necessary and useful fiction, but it is false as soon as it is taken for an hypothesis. . . . Not only the sensations of the so-called higher senses but also those of the lower ones must not be assumed to have an absolute existence apart from ourselves as subjects. Not only does the world of colour and sound exist merely through and in our sensations,¹ but touch too reports nothing more than modifications of our psychological organism.²

He goes on to say that natural science is obliged

. . . to speak of qualities as though they were absolute and objective. For the sake of a more convenient *presentation*³ it dispenses entirely with the subject⁴ . . . and it proceeds *as if* the external world did assuredly exist outside ourselves and *as if*, even without a subject, things were as they appear. Although in reality all that we experience is merely our sensations . . . in the natural sciences we entirely disregard this state of affairs . . . and proceed on the basis of relations far simpler than those actually presented to a careful observation of reality itself.

At the end of the section he associates himself with Lange, as we might expect, in the view that "materialism is only an accessory concept, provisionally and methodically legitimate, but not to be confused with metaphysical reality".

¹ I prefer my term "modulations of consciousness" as being less likely to provoke profitless discussions of the kind which purport to decide whether a sensation is a state of mind or a part thereof and similar verbal acrobatics.

² This is especially important in view of the part played by touch in forming our everyday conceptions of matter. The relevance of the semi-circular canals and of proprioceptors and the like to the development of our spatial and temporal concepts might also have been emphasised here to advantage.

³ Italics inserted: compare this passage with that quoted from Professor Broad above.

⁴ By "subject" is here meant "some conscious being".

I think that the foregoing should make clear what it is that I mean when I say that matter is a fiction, why I insist so unremittingly on the contention, why I hold that it is unimpeachable, and how it is that it for ever knocks the bottom out of the stupid suggestion that Consciousness (or mind, or Spirit, or what you will) is merely an unimportant epiphenomenon of matter.

If it does not do so I am sorry, for "I can no more" without becoming insufferably prolix and repetitive—as, indeed, many may think I have already been.

But, as a matter of fact, the difficulty in accepting the view involved is almost entirely a matter of habit. We are so accustomed to taking the objective and autonomous existence of bits of matter for granted that we find it almost impossible—at least I do—to regard them with any deep conviction as groups of sensations, or to "invert the universe" and realise intimately that modulations of consciousness, which we should loosely call "ideas" and habitually speak of as vague and insubstantial, are far more real than so-called concrete objects.

Yet such a reorientation of attitude is imperative for the understanding of ultimate problems, and that it can be attained not only as a matter of intellectual assent, but of intimate realisation is amply attested by mystically minded writers of many schools.

Unfortunately, mystically minded writers are not usually distinguished by their gift for terminological lucidity and if, in addition, their utterances suffer violence at the hands of bigoted or uninstructed interpreters, the result is likely to be unrecognisably different from the author's intention. This appears, for example, to have

happened in connection with the Indian doctrine of Maya. It is easy to recognise in this the Eastern counterpart of the views emphasised above; yet it is commonly supposed to assert that all material objects are "illusory"—a perversion, if I am not mistaken, of the original intention comparable to that which represents Nirvana as synonymous with "annihilation".

The point is worth stressing if only because I am most anxious to emphasise that, when I insist that the autonomous objective reality of matter is only a fiction, I am *not* suggesting that our experience of matter is illusory. The experiences which we describe as being "of matter" are perfectly real and valid; illusion only arises when we mistake the thing-in-itself fiction for an hypothesis or a fact.

It is strange to note that even so penetrating a thinker as Count Keyserling falls into this error when, *à propos* of Maya, he says:¹

... all European illusionists,² in so far as they can be regarded as honest, were anaemic theorists who attached greater weight to logical argument than to experience.

I take what comfort I can from the use of the past tense, but even so I prefer the view that those to whom he refers were and are the only philosophical thinkers with sufficient intellectual haemoglobin to force their way beyond the naïveties of crude inference and dispel the illusions whereby fact and fiction are confounded.

¹ *The Travel Diary of a Philosopher*, I, 41.

² Some such term as "radical idealists" would be better; "illusionists" is too suggestive of conjuring.

In conclusion of this part of our discussion it will be well for me to remind my readers that once we have this question of fictions firmly fixed in our minds we are perfectly at liberty for the future to make full use of fictional constructs as the invaluable instruments of thought they are and to allow ourselves for all ordinary purposes the luxury of using normal modes of speech.

Few modern physicists take the luminiferous ether seriously, yet we talk about interferometers *as if* it were really there, and I have no doubt that the concept is still used for instructing schoolboys in the elements of optics.

Similarly, there will be no harm in our speaking, as a matter of convenience, of consciousness or mind (or even 'the soul') incarnating in matter, surviving the death of the body, existing in other forms, and all the rest of it, *provided* we never forget that such phrases are no more than convenient verbal constructions enabling us to discuss, *on a strict if tacit basis of AS IF*, the way in which phenomena appear to occur.

In Chapters VIII and IX, particularly, I shall descend from this rarefied altitude and shall attempt to discuss certain phenomena of interest almost like a human being. In order to come anywhere near understanding them we shall, it is true, be obliged to scale the heights again, but it is to be hoped that we shall breathe a little more freely as a result of this preliminary ascent.

PART III

CHAPTER VII

THE NATURE OF PROOF

I

THE word "proof" is commonly bandied about with so little appreciation of its significance that I feel it necessary to devote a few pages to discussing what should properly be understood by it and, in particular, the limits there are to what can be done in the way of "proving".

Unless I take this precaution there is a danger that I may be told that I have set out to "prove" some specific contention fatal to Materialism, and that I have failed to do so.

Or some readers might be left with the delusion that, if only they were a little smarter, they could conclusively *prove* that all idealisms are rubbish.

They could not.

Let us get this quite clear at the start: *Outside of pure mathematics and similarly organised symbol systems there can be no such thing as absolute proof, but only the establishing of a greater or smaller probability. Inside such systems absolute proof is possible, but only because the symbols used are defined in such a way that the conclusions are implicit in the definitions employed.*

This needs a good deal of explanation, and those readers who think it likely to prove tedious may accept and remember this proposition and pass on to the next chapter. They would be better advised not to do so, however; the matter is of some importance and by no means wholly devoid of interest.

It will be well, in passing at least, to remind ourselves that "proof" of any kind, whether absolute or approximative, must be sharply distinguished from Persuasion, Conviction and like processes. A sufficiently eloquent orator may *persuade* his audience of almost anything, while it is not only possible but usual to have strong *convictions* about all kinds of things without being at all prepared to justify logically the faith that is in us. For many practical purposes these states and processes are useful or even in the highest degree laudable; they yield the devotion of the saint and the zeal of the reformer no less than the savagery of the mob and the ineptitudes of the deluded. But they are essentially emotional rather than rational in their character,¹ and as such far removed from the purely intellectual considerations with which we are here concerned.

Let me now illustrate the italicised proposition of the first section.

We may, if we wish, define a circle as "the path traced out by a point which moves so that its distance from a given fixed point is constant", and we may go on to prove that "if from the ends of any diameter straight lines be drawn to any point on the circumference, the angle formed by these lines at that point is a right angle". But, as a matter of fact, we might just as well proceed the other way round. We could perfectly well define a circle by saying that it is "the path traced out by a point

¹ See note on page 29.

which moves with respect to a given straight line in such a way that the angle subtended by that line at the point is always a right angle". We could then amuse ourselves by proving, as a necessary consequence of this, that "the distances from all points on the path to the mid-point of the given straight line are equal". It would probably be a good deal more difficult, but that is irrelevant to the purposes of the illustration.

The point is that the fact of the angle in a semi-circle being a right angle is just as much a part of the circularity of a circle, so to speak, as is the fact that all the radii are equal. So soon as we have defined the symbol "circle", by reference to whatever sufficient¹ property we may choose, we have implicitly and automatically stated all the other properties involved in being circular. The order in which we happen to recognise them has nothing to do with it.

Similarly, the proposition "Two plus two equals four" is absolutely true and can, with difficulty, be rigidly proved; but this is only so because the symbols "two" (or 2), "plus" (or +), "equals" (or =) and "four" (or 4) have been so defined as to make it so.

The statement that all other sorts of proof are and can only be matters of assessing probability may come as something of a shock to many people; but this is only because, in the affairs of everyday life, it is seldom practicable to express such probabilities in numerical form, so that, lacking frequent reminders, we are apt to confuse the probable with the certain unless the element of doubt is large.

In criminal courts, for example, we commonly speak

¹ The word "sufficient" is necessary because there are some properties, such as that of being produced by the intersection of a plane with a cone, which are not definitive.

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of having "proved" a man guilty of theft, say, whereas what we have actually done is to show that it is more probable—usually much more probable—that he stole the goods than that he did not. Nor could we ever, in any circumstances, do more than this. Even if twenty witnesses of unblemished reputation were to swear positively to having witnessed the crime the possibilities of mistaken identity, of collective hallucination and of conspiracy must be taken into account. In England the last named would rightly be treated as negligible; in India, where, according to Mr. Kipling, "evidence of murder—complete with corpse—may be purchased for a hundred rupees", a jury might have need of greater scepticism.

In practice, as already noted, it is seldom possible to assign a definite numerical value to the chance of even a simple proposition, such as "Jones stole my motor car", being true. We can hardly imagine a jury returning a verdict in the form "There appear to be 217 chances out of 324 that this man committed the theft and we therefore say that he is Guilty", or even "The odds appear to be about five to four on his having done it; but as the odds of four to five in favour of his innocence constitute a reasonable doubt, we bring him in Not Guilty".

None the less we do tacitly recognise the quantitative nature of proof when we demand stronger evidence before hanging a man for murder than before giving him three months in the second division for some lesser offence.¹

¹ It will be convenient to explain here that probabilities or chances are usually expressed as fractions. Thus, if there is one chance in three of an event occurring or of a proposition being true we say that its probability is $1/3$; if two chances in five, we say it is $2/5$, and so on. Clearly there cannot be more than three chances in three, or five in five, etc., so that this fraction can never be greater than 1. This represents certainty and is not found outside pure mathematics

This matter of the quantitative, or as we may call it, approximative nature of proof is so important to sound thinking on every subject that I need make no apology for a short digression to make the point clear.

It would seem that at one time it was supposed that formal Logic provided a kind of infallible technique *for arriving at* correct conclusions. This view is now so out of fashion that it is not uncommon to hear people say sneeringly: "Oh! Of course you can prove anything by *Logic!*" This is nonsense. You can only "prove" untrue propositions "by logic" if either the assumptions made or the logical processes employed (or both) are faulty. The relation between these assumptions (known as premises) and the conclusion is precisely that between the figures given at the beginning of a sum in arithmetic and the result obtained at the end. In fact, formal logic can best be described as a sort of verbal mathematics. Both are systems in which symbols are operated according to certain rules, and the results obtained by their use are correct only if the proper symbols are chosen to start with and the appropriate rules correctly applied.¹

and the like, where it is assured by definition. The same applies to "impossibility", which is represented by a chance of 0. To speak of "odds" of five *to* four, three *to* eight, etc., is equivalent to saying five chances *in* nine, three chances *in* eleven, or probabilities of $5/9$, $3/11$, etc. I shall sedulously avoid mathematical forms in this book, in order not to alarm the lay reader, but a realisation of these simple facts may help to illuminate the discussion.

¹ Example: "My income is £737 per annum; income tax is 1s. 7d. in the pound; the tax payable is therefore £27 14s. 9d.". This conclusion is wrong for three reasons: first, my income is not £737 per annum; secondly, income tax is not 1s. 7d. in the pound; thirdly, the sum has been done wrongly, the right answer, on the assumptions given, being £58 6s. 11d.

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This is now fairly generally recognised, together with the corollary that logic never helps us to arrive anywhere. All it can do is to tell us whether we have taken the right train and have got out at the right station.

What actually happens is that we arrive at some conclusion or other by what I can only describe as a kind of intuitive leap,¹ the psychological mechanism of which, however, can be explained without serious difficulty. It is only after this, if at all, that we use logic to test our conclusion by seeing whether we can construct a continuous sequence of logical steps (syllogisms) connecting that conclusion with unimpeachable premises. If we can, then our conclusion was right; if not, then our "leap" was ill-directed and we must try again.

I need hardly say that in ordinary processes of reasoning and discussion this procedure is abbreviated out of all recognition. None the less, the fully expanded account of any such process would be found always to take this general form.

In partial anticipation of a later chapter it may be noted here that the difficulty in coming to correct conclusions lies not so much in making intuitive leaps, which is easy enough, or in checking them by the application of the rules of logic, which are fairly simple, as in deciding what premises really are unimpeachable. At one time it was supposed that it was sufficient to find premises about which there was universal *agreement*—so-called "axioms" which were "obviously true". But

¹ This is true even in mathematics. We pass mathematical expressions through a series of transformations—division, addition, differentiation, changing of parameters, etc.—in order to arrive at the final result. These transformations must be effected strictly in accordance with the rules of the game, but at each stage the decision as to what to write down next constitutes an "intuitive leap" of the kind mentioned.

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we are realising more clearly every day that this is altogether wrong and misleading; when it does not lead direct to absurdity it serves only to establish more firmly our most fundamental errors through their acceptance by yet another Authority. The history of scientific thought shows clearly that the most "obviously true" propositions, such as the flatness of the earth or the substantiality of matter, are in the gravest danger of being upset.

It might be going too far to say that the more "axiomatic" a proposition appears the less likely it is to be true, but we shall certainly find it wise to scrutinise with especial suspicion any proposition which appears particularly "indisputable".

5

One standard form of syllogism is: "All S is P ; M is S ; therefore M is P "; for example, "All men are bipedal; Jones is a man; therefore Jones is bipedal". It is obvious that the conclusion ("Jones is bipedal") is absolutely proved thereby if, and only if, the major premise ("all men are bipedal") and the minor premise ("Jones is a man") are themselves absolutely true. But they can only be made so *by definition*.¹ If this is not done, if, for example, we do not make sure when defining the class labelled "bipedal", that it includes all the objects in the class

¹ Observation is not sufficient, since it cannot include *all* men throughout time and space. In special cases where it can cover the ground completely it automatically renders the syllogism futile. "All the men in that room are cross-eyed; Jones is one of them; therefore Jones is cross-eyed." The process of observation which assured us of the premises must also have informed us of the conclusion. Besides, if we were to rely on observation, how could we, without preliminary definition, decide which observed objects were "men" and which not?

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labelled "men", there must always be a chance that there are some men who are not "bipedal", such as the retired soldier of whom Hood recorded that

A cannon ball took off his legs
So he laid down his arms.

Similarly, unless we define the class of objects labelled "men" in such a way as automatically to include the object labelled "Jones", there is always a chance that Jones may not be a member of that class at all.

But it is evident that, if we do frame our definitions in the way suggested, the syllogism becomes useless as an instrument of creative thought and reduces to little more than a rather roundabout way of stating something which we knew to start with. It retains, however, its value as a method of checking our conclusion and constitutes a good answer to any question which may be raised as to why we conclude that Jones is not a centipede otherwise than as a result of counting his legs.

But in neither of these ways would it be useful if the premises were unsound and it would appear therefore that the most valuable function of Logic is to enable us to recognise our assumptions.

It would appear from the foregoing that this kind of formal logic is a somewhat arid, not to say barren, subject. And so it usually is, unless we give it an injection of probabilities.

Our syllogism then reads: "There is a chance a that any S is P ; there is a chance b that any M is S ; therefore there is a chance $a \times b$ that any M is P ." Or, in the particular case quoted (slightly expanded): "There is a chance p that any member of the class labelled 'men' (defined by attributes other than that of having two feet) is bipedal; there is a chance q that the object labelled

'Jones' is a member of the class labelled 'men'; there is therefore a chance $p \times q$ that the object labelled 'Jones' is bipedal."

In this way it seems possible to infuse some degree of life into the dry bones of syllogistic logic.

The relevance of these remarks to the main trend of our discussion is simply that they should enable us to understand why it is that every conclusion, except those assured in advance by definition, must necessarily be the expression of a probability, even although we may not always take the trouble to state it in that form or even be in a position to do so quantitatively. We may note, as a corollary, that unqualified assertions of any kind are, as such, imprudent, though we often use them legitimately in the interests of brevity. Although it is very rare for us to be able to assign a definite numerical value to the chance of any proposition being true, it is unfortunate that we are so seldom cautious enough even to say "It seems probable that . . ." rather than "It is so".

From our neglect arises Dogmatism.

6

So far, however, we have dealt only with one half of our difficulties. The way in which the other half enters into the problem is not easy to explain in a formal manner and it will be best to proceed by means of illustrations.

Speaking informally, the point is somewhat as follows: Certain events (or propositions) may be unlikely in themselves, but in their context more likely than their alternatives. In any given situation, therefore, we are liable to have to consider not one probability only, but a combination of two, in order to arrive at a final conclusion.

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A very simple example is afforded by conflicting testimony. Suppose that six observers report that a certain event has taken place. Suppose also that we know from previous experience that each of these is right, on the average, nine times out of ten when dealing with events of this nature. Then it can be shown that the odds on the event having actually taken place when they unanimously say it did are 531,441 to 1. So far so good; we conclude, quite rightly, that the event is very likely to have taken place; that is to say that it has been established to a high degree of probability. But this is only because we have no reason to think that it did not occur. Now suppose that these witnesses are flatly contradicted by ten other witnesses who, on the average, are right nine times out of eleven. The situation is greatly altered, for it can be shown that the odds *against* the event, deduced from the testimony of the second group, are about 3,486,781 to 1 as compared with 531,441 to 1 in its favour established by the first. Thus, the combined or "nett" chance, if I may so describe it, is distinctly against the event.

We may approach a step nearer the kind of situation which is met with in real life by considering a case in which testimony is opposed not by other testimony but by what I may call the inherent improbability of the event. Suppose, for instance, that the event reported by our first group of observers has been a sequence of five "zeros" at roulette. It is easy to see that, since a roulette wheel carries numbers from 0 to 36 inclusive, the chance of zero (or any other particular number) coming up on any given *coup* is $1/37$ and the chance of its doing so five times running is $(1/37)^5$ or about $1/69,000,000$ (one in sixty-nine million). In these circumstances we should conclude that, taking *all* the facts into consideration,

the odds were considerably against the observers being right.¹

In practice, of course, we should not come to this conclusion—not because the theory is incorrect but because the reliability of reasonably intelligent observers is enormously higher than we have assumed for purposes of illustration. Our decision would, moreover, be influenced to some extent by whether the event were reported of the Sporting Club at Monte Carlo, of an illicit gambling den in Marseilles or of some product of the local toy-shop.

We can take another step towards real life by considering cases in which our witnesses report events of which the inherent probability, though small, cannot be quantitatively assessed.

If our observation group unanimously stated that they had seen Dean Inge jump over St. Paul's Cathedral we should unhesitatingly reject their evidence, even though their credibility were assessed at a far higher figure than we have supposed. But if they merely reported him as having been found bathing in the font we might well halt between two opinions. The inherent improbability of such an event is admittedly large—but great wits live dangerously, as Dryden assures us, and Festus, at any rate, would have had no hesitation in accepting the phenomenon. We, in a more matter-of-fact age, would turn to statistics for light on the incidence of insanity in the *genus* Deans, *species* Pauline, *sub-species* Gloomy.

¹ Or in favour of the roulette wheel not being a normal wheel: the addition of two extra zeros, for example, would be more than sufficient to produce the required effect, since the chance of zero coming up on any given *coup* would now be 3 in 39 or $1/13$ and the chance of a sequence of five would be $(1/13)^5$ which is only $1/371,293$.

It is easy now to take yet another step and think of cases in which neither the credibility of the observers nor the intrinsic likelihood of the event can be given a numerical value. Such cases include a wide range of phenomena, from the life story of the liverfluke, *via* the miraculous healings of Lourdes, to the Indian rope trick. In considering problems of this kind we are always obliged to attempt the balancing, as it were, of one rather indefinite probability against another in order to arrive at our conclusion.

Finally we may substitute some such phrase as "weight of evidence" for "credibility of observers" and "proposition" for "event". We thus obtain an idea of an entirely general form under which all particular cases of proving and believing can be subsumed.

In general, that is to say, we are confronted with a situation in which, on the one hand, a proposition is supported by a certain body of evidence, which in special cases can be summarised in the form of a definite chance in its favour; while on the other hand there is what I may call a general context, provided by our total experience of the world as a whole, and this constitutes another body of evidence, which may or may not be consonant with the first and again may, in special cases, be summarised as a numerically definite chance. Our final judgment is formed by combining these chances or bodies of evidence.

When the resultant chance appears to be overwhelmingly in favour of the proposition, i.e. when it approximates closely to unity, we accept the proposition; we say that it has been "proved" and that we "believe" it. When

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the chance seems negligibly small, i.e. when it approximates closely to zero, we reject the proposition and say that it has been "disproved" or that we disbelieve it. When the evidence seems nicely balanced, i.e. when the value of the chance is about one-half, we return a verdict of Not Proven and remain in doubt. This is universally true and is not affected by the fact that we very seldom state or are even conscious of the form which the situation takes.

It should be clear from the foregoing that the psychological condition opposite to belief is not disbelief but doubt. Disbelief in a proposition is equivalent to belief in its opposite. The remark "I do not believe so and so" ought to be used in the sense "I-do-not believe-so-and-so"; commonly, however, it is used in the sense of "I *disbelieve* so and so". A more general recognition of the point would do much to promote the spirit of sweet reasonableness.

8

The foregoing should be comprehensible enough as stated, but it actually takes us into rather deep waters.

It might reasonably be asked by what right we arbitrarily separate off "a certain body of evidence" in favour of a proposition as being particularly relevant and then, at a late stage of the enquiry, introduce a "general context provided by . . . the world as a whole". Facts, it might be objected, are either relevant or not relevant and the totality of all which are, neither more nor less, constitutes the evidence on the subject.

This is perfectly true and the defence of the arbitrary procedure in question is simply that it is a matter of practical convenience.

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The effort to assess all the relevant evidence at once is frequently too much for us, so that we are compelled to deal with it piecemeal. Besides, we usually come across it in the form of fairly well-defined groups of facts, or else we undertake specific investigations along particular lines, and we find it least confusing to assess the evidence of each group or investigation separately before combining them into a final judgment.

This matter of practical convenience affords the only valid distinction which can be drawn between what are usually called *ad hoc* and *a priori* considerations. People often talk as if there were a kind of mystical or transcendental value attaching to *a priori* probability, which somehow entitles it to override *ad hoc* evidence regardless of the intrinsic weight of the latter. This is presumably because we usually know the source of the *ad hoc* evidence, for which this familiarity instantly breeds contempt; whereas we are vague about the *a priori* evidence which is consequently liable to appear to us as in some way magically "given" *ab extra*, quite independently of experience, observation or enquiry of any kind. This is unfortunate, since vagueness is actually inimical to logical cogency. But it serves to explain how it is that considerations which are identified as being of an *a priori* character tend to become invested with a false importance and to exercise a disproportionate influence in the formation of final judgments as compared with the less mysterious results of *ad hoc* study.

Apart from this matter of origin, the view in question is quite unsound. In the first place, even if we admit the incursion into the field of enquiry of influences *ab extra*, the mere fact of their entry automatically makes them part and parcel of the total relevant evidence, to be dealt with on their merits just like other items. In

the second, we have no real reason for saying that any one part of this total body of evidence is more *a priori* than any other except, quite unimportantly, in point of time.

That is to say, we may, in one sense, fairly describe as *a priori* all the evidence bearing on a problem which exists *prior to the commencement of some particular enquiry*. We may, if we wish, arrange all knowledge on the subject in chronological order, item *A* preceding item *B*, *B* preceding *C*, *C* preceding *D* and so on. Then, if we are considering item *F*, items *A*, *B*, *C*, *D* and *E* are *a priori* with respect to *F* and may collectively yield a probability which the new item may increase or diminish as the case may be. Thus, until somebody tried it, various indications were taken as indicating that if a man were to drop freely through a height of five thousand feet he would lose consciousness. These indications constituted the *a priori* evidence up to the moment of the experiment and I suppose that most people would have assessed the odds in favour of the proposition being true as being at least a hundred to one. The results of *ad hoc* experiment conflict with this expectation, for normal persons (if, indeed, any such experimenter can be considered normal) do not lose consciousness in the course of such a drop.

But the use of the term *a priori* in this purely chronological sense is very artificial and misleading although it seems to be partially sanctioned by a kind of tacit tradition. Actually, the practice is little more than a formal tribute to the notion of "priority" which the words *a priori* suggest.

It has, however, the advantage of enabling us to see clearly that, if we go back far enough, we necessarily reach a point at which the relevant information is nil. This is the only point at which we can legitimately speak

of considering a proposition absolutely *a priori*; any other stage must be after the receipt of, or *a posteriori* with respect to, some evidence or other. But at this genuinely *a priori* stage we clearly cannot possibly have any reason whatever for supposing that the proposition in question is more likely to be true than not. No kind of judgment can be formed about the proposition "*X* is *Y*" until *X* and *Y* have at least been defined: and the very process of definition automatically introduces a whole mass of relevant evidence.

This is the justification for saying that "considered genuinely *a priori* all propositions are equally likely" (p. 46). At this stage of complete nescience the chance of any and every proposition being true is precisely one-half.

But this chronological handling of evidence seldom occurs in practice. I have dwelt on it here mainly because it serves to show that so-called apriorist reasoning really is as silly as it seems. The more apriorist it is the less knowledge is there behind it. If, logically considered, it means anything at all it can only mean resolutely discarding as much information as possible before beginning to think about it; as who should take a powerful emetic the better to digest his dinner.

Those, therefore, who seek to discredit idealistic views on *a priori* grounds would do well to tread very warily.

What actually happens in practice is what I have already described, namely, we derive a probability of a certain value from some selected group of facts, a process which we style *ad hoc* investigation, and then combine it with another probability derived from *all the rest of* the relevant facts. This last I have called the "general context" and, although the terms may not be perfect, I should much prefer, and venture to suggest, the use of "contextual evidence", "contextual chance"

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and similar locutions to the alternatives which employ the words *a priori*. The former at least indicate, without any suggestion of *arrière pensée*, what one is talking about, while the latter are apt to assume a meretricious importance due in part, perhaps, to their association with Time.

According to the suggested procedure, then, we say that the total evidence E relevant to any proposition may properly be regarded as made up of a number of facts, or groups of facts, G_1, G_2, G_3 , etc., so that

$$E = G_1 + G_2 + G_3 \dots + G_n \dots + G_N$$

or $E = \sum G.$

(N.B.—The use of the addition signs does not signify that any process of addition in the arithmetical sense is involved; they merely provide a convenient way of saying that all the G 's must be taken together in order to arrive at E . Similarly, the suffixes 1, 2, 3, n , etc., do not refer to or imply any *order*, chronological or otherwise, but are written merely for purposes of identification.)

Then we can pick out any group, G_n , for special examination, and this examination constitutes *ad hoc* enquiry. The remaining groups, namely $E - G_n$, form the "contextual evidence", commonly but misleadingly called "*a priori* evidence".

This seems the only logical procedure.

The quantitative value of the final judgment, that is to say, the probability P_E that the proposition in question is true, arrived at after *all* the relevant evidence has been taken into account, can clearly only be obtained by combining all the probabilities P_1, P_2 , etc., according to the ordinary mathematical rules. The symbol P_n , of course, refers to the probability of the proposition being true derived from a study of the facts G_n taken by them-

selves; similarly the symbol P_c would refer to the contextual probability, that is to say, the probability derived from all the evidence taken together except that picked out for *ad hoc* study.

9

This discussion, from the beginning of Section 6 onwards, may well have appeared to the reader to be highly academic and far removed from practical politics. The second part of the charge is erroneous, however, for the point elaborated is of considerable importance for at least three reasons.

In the first place, it gives the theoretical aspect of our practical reaction to the outcome of enquiries. We often feel, and quite rightly, that, although the evidence in favour of a given conclusion is undoubtedly very strong, yet our "common sense" impels us irresistibly to reject it. Often we are quite inarticulate in the matter and this inability to formulate our thought fills us with an irritating sense of impotence at the apparent weakness of what we are sure is really a strong case.

In the terminology just suggested it is clear that, although the *ad hoc* probability in favour of the conclusion is high, our almost unconscious summing up of the contextual evidence suggests an even larger probability against it.

This would be harmless and even beneficent if our summing up were determined only by rational factors, for common sense is not invariably misleading. Unfortunately it opens the door wide for the entry of emotional prejudices. No matter how cogent the *ad hoc* evidence may be, the resolute sceptic can always fall back, implicitly or explicitly, on the contextual evidence, which

he can claim to be of any extent and almost of any kind he pleases, without risk of contradiction. Thus, if I were to show by unimpeachable experimental methods that the chances in favour of survival of death, say, were a thousand million to one, my sceptical opponent can always reply "Yes, I admit that your evidence is very strong, but in my judgment the contextual evidence, as you call it, is very much stronger in the opposite direction. I cannot give you chapter and verse for this contention nor evaluate it quantitatively; but it is at any rate based on an observation of the universe more extended than your pettifogging experimentation".

For such an attitude unwaveringly pursued I know of no remedy save prayer or, if practicable, violence.

10

The second reason is somewhat paradoxical. We started by stressing the essentially quantitative nature of proof and insisting that although we cannot always assign numerical values to the results of our reasoning, they are none the less of a nature to which numerical values could, in principle, be given and that they do in fact possess, so to speak, such values even when we cannot work out what they are. We must always keep this idea in the back of our minds, but we must now jettison it for nearly all practical purposes and admit that it is a rare exception rather than the rule for us to be able to assign any numerical value to a *final* judgment. I even doubt whether there is any exception at all.

We can, of course, often assign a numerical value to the probability yielded by *ad hoc* experiment; in fact we often do, and even more often should, devise our experi-

ments with precisely this end in view. It is the contextual evidence which is the trouble. In cases where we are dealing with such simple things as roulette wheels it often looks as if we could precisely calculate the contextual evidence. But this is only because we rightly dismiss as negligible for practical purposes certain chances which we cannot assess, as that the Sporting Club authorities have suddenly elected to fit wheels with three zeros.

Hence we have not necessarily "proved" any case merely because we have established a numerically large probability in favour of it as the outcome of an *ad hoc* enquiry; just as much depends on the contextual evidence and the probability determined thereby. This we can never, in general, completely evaluate—if only because our knowledge is never co-extensive with the universe.

It must not be supposed, however, that the production of a large probability from *ad hoc* enquiry is not worth doing. It very emphatically is; it is at least better to have half the picture clear than none at all.

Moreover, when we have done this, we may fairly claim to have transferred the onus of proof to the other parties to the controversy; it is now up to them to show that the contextual probability is both opposite in sense to that which has been produced and greater in value.

This is the proper reply to the "resolute sceptics" imagined in the preceding section; but as such creatures are, *ex hypothesi*, almost impervious to reason the manœuvre is unlikely to be effective.

Speaking with all due caution, I am inclined to suspect that we are thus setting our opponents a literally impossible task when it is a matter of their being obliged to prove a negative proposition,¹ as that "Consciousness

¹ I have no intention of embarking upon or of being drawn into a general discussion of negative propositions. This subject has been

does not survive death" or "Consciousness cannot occur except in association with matter".

II

Thirdly, it should be clear that, since the value of a final or "over-all" judgment is obtained by combining the *ad hoc* and contextual probabilities, it may be varied by varying either of these two. Colloquially speaking we can legitimately strengthen our case either by increasing the cogency of our own arguments or weakening those of our opponents. There is nothing new in this and I mention it only to point out that the process does not operate quite in the way that might be supposed. To reduce the force of our opponents' arguments to vanishing point does not raise our own beyond their intrinsic value; it is not a matter of decreasing indefinitely the denominator of a fraction so that its value approximates increasingly to infinity. If the *ad hoc* probability of a proposition being true is 3 to 1, say, the fact that there is nothing to be brought against it from contextual evidence does not make these odds overwhelmingly coercive; they remain exactly what they were.

I point this out merely by way of warning to those who might suppose that by controverting their opponents' case they have thereby invincibly established their own.

adequately dealt with by others. It is sufficient here to point out that some of them are easy enough to deal with, being only ordinary propositions with a negative sign attached. The proposition "Jones was not in London on Friday" is, in principle, as easy to prove as "Jones was in London on Friday". This is clear if we read it "Jones *was* not-in-London (i.e. *was* elsewhere) on Friday". No display of pyrotechnic logic-chopping should be necessary to persuade the reader that disguised positive propositions are very different from negative propositions of the kind referred to here.

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The point applies, of course, equally to both sides of every dispute.

The question of what degree of probability is to be demanded before we "accept" a proposition is one which is settled in practice mainly by the temperament and prejudices of the individual concerned. Strictly speaking, we should "believe" all propositions whose "over-all" probability (P_E) is greater than one half and so far as intellectual assent is concerned I suppose that most of us would be ready to agree to this. But there is a good deal of difference between belief in this rather arid sense and belief of a kind strong enough to form a basis for action; the point at which the latter begins is hardly a matter which can be settled by logic, although it is clear that the more important the issues involved the greater the magnitude of the probability which will be demanded. We ask for a greater chance of the proposition "this parachute will open when you jump" being true than we do of "this machine will deliver a bar of chocolate when you put a penny in it".

For scientific purposes, however, the criterion of "better than even money" or "more likely than not" is the only one which can be allowed to decide whether a proposition shall be admitted into the *public* world of scientific knowledge, as Professor Hogben calls it, or remain outside in the *private* world of individual conviction.

12

This rather involved chapter may now be summarised as follows:

Absolute proof does not occur in nature. Unless we are able to bring the subject matter of a discussion within the scope of a symbol system, such as mathematics or

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formal logic, in which the symbols can be manipulated according to specific rules, it is impossible rigidly to prove any proposition. Whenever we can do so we shall find that our conclusions were implicit in our premises.

This cannot always be done, so that for many questions of living interest we have to be content with a quantitative or approximate, rather than an absolute, outcome to our thought. This takes the form of a probability or chance, which can sometimes in practice be assigned a numerical value, but more usually cannot.

This probability is, in general, composite in origin; it is derived on the one hand from the results of *ad hoc* enquiries, on the other from the probability yielded by *a priori* considerations—better called *contextual*.

To "prove" any proposition consists, therefore, in showing that this combined probability is greater than one half. This is all that can ever be done, so that if, when we say that we believe something, we mean anything more or less than just this, we are deserting the realm of reason for that of prejudice, emotion or temperamental predisposition.

To establish a probability greater than one half in favour of our contentions, from the results of *ad hoc* enquiries, automatically puts the lead into the opponents' hand, so to speak, and in matters of the kind which we are considering this involves them in the task of attempting to prove a negative proposition of a kind which it seems literally and strictly impossible to prove.

The importance of these considerations will become very apparent in the course of the next two chapters.

CHAPTER VIII

PARAGNOSIS:

STATUS OF TELEPATHY AND COGNATE PHENOMENA

He who knows not, and knows not he knows not,
He is a fool, shun him.

EASTERN PROVERB

I

I AM credibly informed that there are still surviving some persons so lost to all sense of intellectual propriety as to deny that telepathic and cognate phenomena are a proper subject for scientific enquiry. For such deaf adders I charm not; normal persons recognise that the only point debatable is whether such phenomena are properly to be considered supernormal or not; whether—as I should rather prefer to put it—they do or do not constitute examples of non-classical behaviour inexplicable by the extension, however great, of the established laws of mechanistic biology. If they are, they are relevant to our enquiry; if not, they must be handed over to psychopathologists and other exponents of classical methods.

I shall here concern myself almost exclusively with telepathy, although I shall not scruple to claim other phenomena—such as those of clairvoyance, veridical dreams and various automatisms—as good grist for my mill. Broadly speaking, I want to lump together the whole of what are commonly described as the “mental”—as opposed to the “physical”—phenomena of psychical research and to treat them from a single aspect. For

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convenience of reference to this aspect I shall, as occasion may demand, use the words "paragnosis", "paragnostical" and the like; the point being that all the phenomena I have in mind—whether telepathic, clairvoyant, clairaudient, telaesthetic, spiritistic, oneiral, psychometric or the rest—are alike in the fact that the behaviour of some person concerned—whether a medium or not, awake or asleep, entranced or otherwise—shows signs of the possession or acquisition of knowledge (gnosis) which is, *prima facie*, beyond (para) what can be ascribed to the operation of classical law.

I shall talk mainly in terms of telepathy; partly because it is the most convenient peg on which to hang the argument; chiefly because it leads to the most interesting results. But, *mutatis mutandis*, most of what I say is equally applicable to other phenomena of the same class (defined by the feature of paragnosis), which may have their own contributions to make to our understanding of consciousness.

It must be clearly understood that, for the purpose of the present argument, I am not only not prejudging, but am not even interested in the ultimate origin of those phenomena which claim or are claimed to emanate from deceased persons. They are of great importance to me, but solely as regards their paragnostical not their spiritistic aspects.

Too many evasions take the form of saying, about such phenomena, "Oh yes! But don't you think they are all due to telepathy?" Actually I don't; but the point is one for students of psychical research to settle in their capacity as such. I propose to short-circuit all such argument by replying, "That is possible; let us suppose so; in that case the evidence for telepathy is enormously strengthened". It is telepathy that interests me here, not

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spirits; and I can hardly imagine anyone having such a grudge against telepathy as to attribute all apparent cases of it to spiritistic activity!

But it is clear that if, by throwing ostensibly spiritistic phenomena into hotch-potch, we establish non-classical behaviour as a fact in nature, we thereby smash for ever the ring-fence of classical law in this domain—as already in others—and can afterwards, if further enquiry shows it to be justifiable, grant that these phenomena may indeed proceed from their *soi disant* sources.

This is not a *petitio principii* or circular argument, as might rashly be suspected; those who are doubtful may try it out as an example. The point is that paragnosis of any kind is incompatible with classical law; the origin of the paragnosis is of secondary importance scientifically, no matter what emotional significance it may possess.

2

Outside of a small body of instructed students, opinions about telepathy appear to consist of one or more of the following erroneous views:

1. Telepathy is an accepted fact of the scientific world.
2. Telepathy does not occur; this dogma is occasionally put in the more cautious form that there is insufficient reliable evidence to warrant a belief in its occurrence.
3. Telepathy is in some way like or akin to "wireless".
4. Telepathy is of no particular importance anyway.

These four propositions are to some extent interconnected; in particular if telepathy were akin to wireless it would be of no importance at all—at any rate for us—and could be relegated without more ado to the Correspondence

Colleges. I should not even mention the suggestion here were it not impracticable to the point of impossibility to so much as begin to account for telepathy in terms even remotely resembling those used to describe the generation, transmission and reception of electromagnetic waves. Similar remarks apply to the comparison of clairvoyant phenomena with those of X-rays. On the contrary the telepathy-wireless comparison will probably in due time come to be regarded as the *locus classicus* of the misleading effects of too facile analogy; it has already done untold harm in stifling intelligent thought on the subject. It is precisely and solely the fact that paragnostical phenomena are *not* explicable in such terms that invests them with their tremendous significance as deviations from classical psycho-physiology.

It is presumably due to a deep-seated, if scarcely formulated, suspicion of this that we may attribute—in part at least—the reluctance of orthodox science to admit paragnostical phenomena to the fold of the public world. I cannot refrain from quoting a passage on a closely parallel matter from Dr. J. J. van der Leeuw:¹

A doctrine presented to us without proof is as a stranger without papers or introductions; we look at him askance and can hardly bring ourselves to accept him at his own value as a human being. He too must be “proved” for us, he must be linked up in the chain of known quantities of which our conventional life is composed. A doctrine or truth, presenting itself without proof on the bare value of its own nobility, is as disturbing a factor to the majority of men as would be the stranger without name or country. We are afraid of it, it is to us an invasion from an unknown world.

¹ *The Conquest of Illusion*, p. 52. The whole of his treatment of many of the subjects I have dealt with in this book, approached from an angle very different from my own, is better worthy of study than almost any other work I can think of.

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If we reword this to apply to phenomena presented without at least potential explanations, whereby they may be "linked up in the chain of known quantities of which our (scientific) life is composed", we have an admirable statement of how scientists regard paragnostic phenomena. And who shall blame them?

The other serious difficulty is that of unpredictability. I do not think that scientists would greatly object to the phenomena if, even without proffering any explanation, we could say "A and B will be in telepathic *rapport* whenever event *X* occurs" or "I always have a verifiably veridical dream whenever I dine off snails, lobster Neuburg, *fritto misto*, haggis, *bombe russe* and a pint of vodka".

Unfortunately—from one point of view—paragnostic phenomena do not lend themselves to straightforward explanation, as scientists understand the term, and not enough is yet known of the conditions which determine their occurrence to enable us to predict them or to produce them at will with any degree of certainty.

Consequently, scientists as a whole are very chary of conceding these phenomena at all; so that those who suppose that telepathy would be advanced as an official explanation of ostensibly spiritistic communications are in error; fraud, self-deception, and coincidence are far more likely to be invoked.

This is not to say, however, that no scientists of repute accept the phenomena of telepathy, clairvoyance or even of psychometry. Apart from the relatively few of well-known names who have publicly proclaimed their "belief in" such things, very many do so as a matter of personal opinion—probably all who have seriously studied the subject. But such beliefs form part of their private worlds; no variety of paragnosis has yet attained the status of "publicity" as a recognised scientific fact.

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I have indicated two of the principal reasons for this; the situation may be more comprehensively summed up by saying that the general estimate among scientists is that the *a priori* or—better here—the “contextual” probability against the phenomena notably outweighs that in their favour derived from *ad hoc* experiment and observation.

I say without fear of contradiction that this estimate is based on the (perfectly correct) opinion that paragnostic phenomena conflict with, or constitute grave deviations from, classical law. And if, as was once supposed, such deviation were intrinsically very improbable—if paragnostic phenomena stood alone in this respect—the hostile weight of contextual evidence would indeed be enormous. But, according to the theory advanced in Chapter V, and in conformity—as was there shown—with the recent history of science, deviation from classical law is to be expected whenever a public predicate is exaggerated, as I have suggested that one—namely, complexity—may be when consciousness is of so high an order as in man.¹

The contextual improbability of the phenomena therefore vanishes and is actually replaced by an expectation in their favour, if my suggestions in this matter be even provisionally accepted. We may therefore attach just as much weight to the evidence in favour of paragnostic phenomena as *ad hoc* study indicates that it deserves.

¹ I do not wish to enter here upon the question of whether a “sensitive” or “medium” is to be regarded as of a higher order of consciousness than other people. The point is unimportant here. Personally I see no reason to suppose anything of the kind; as will be implied later, I regard some measure of paragnosis as the rule rather than the exception; its exaggeration in certain cases—more likely, I suspect, to result from removal of inhibitions than from the presence of an abnormal faculty—is a subject for separate enquiry of a quasi-pathological type.

Anyone so rash as to deny that the *prima facie* evidence for paragnostical phenomena is strong thereby proclaims himself either an ignoramus or a bigot; and it is only considerations of courtesy which prompt this euphemism.

The evidence, in fact, is almost distressingly copious. I suppose that a good fifty per cent of the forty volumes of the *Proceedings of The Society for Psychical Research* is relevant, together with a like amount of the *Journal*. There are also the similar publications of foreign Societies, innumerable books great and small and several works of major importance. On top of this, every second person one meets has a fund of strange and more or less interesting stories to tell, which may or may not have something to do with it.

I do not think that any good purpose would be served by belabouring the reader into a state of bemused acquiescence by the reiterated impact of case after relevant case. I have treated him badly enough as it is without adding injury to insult. So, although it would be easy to heap the Pelion of experimental on the Ossa of spontaneous data and to quote authorities from Sidgwick, Myers and Hodgson to Richet, Tischener and Murphy, I think it better to limit myself to discussing, with a minimum of exemplification, the question of whether we can take this mass of evidence at its face value and, if not, why not?

I said in the last section that, if the suggestions I have made be regarded as sufficiently reasonable to be provisionally adopted, the contextual improbability of the phenomena vanishes, so that the question of whether they actually occur may be left to *ad hoc* investigation

alone. It is possible that, at that point and as a matter of formal rigidity, I ought to have circumscribed the scope of the *ad hoc* enquiry. I regard it as the task of deciding, on the evidence available, which apparently paragnostical phenomena, if any, are to be accepted as such and which, or what proportion, are to be relegated to normal categories such as fraud and coincidence.

I hope this will be clear. We know that "pure coincidences", i.e. coincidences to which we attach no causal significance and do not interpret as the outcome of any particular process, do occur and that people do sometimes play tricks on us. Consequently, even if we have no *a priori* prejudice against paragnostical phenomena, we shall not accept all candidates that appear, but shall scrutinise the credentials of each not the less carefully because we are willing to admit any which are up to standard.

Thus if, while watching a game of baccarat, I amuse myself with prophesying whether the bank will win or lose, I shall not claim paragnostical achievement if I guess right fifty-three times out of a hundred, for pure chance might well account for this; nor shall I necessarily regard as non-classical behaviour a mediumistic statement that my father had bushy eyebrows, a firm chin and grey-blue eyes, for this description would fit very many men.

Broadly speaking, our business in dealing with such phenomena in their paragnostical aspects is, first, to eliminate fraud and the possibility of latent memory and, secondly, to decide whether they do in fact occur more frequently than pure chance would lead us to expect.

I do not propose to waste time here refuting in anticipation such silly remarks about fraud as may be made by those who know no better. They are not qualified to speak, nor are they deserving of notice, until and unless

they have studied the subject. If ever they do so they will find out that, whereas the *physical* phenomena of spiritualism are almost inextricably mixed with fraud,¹ there are ample quantities of "mental" phenomena, of the kind we are here considering, from which all chance of fraud may safely be considered as eliminated. Very much the same is true of cryptomnesia; occasional cases crop up here and there, but its influence may be excluded by systematic work.

All serious students of the subject will, I think, agree that when, in the course of a preliminary sifting, we have thrown out all cases which might credibly be ascribed to fraud, cryptomnesia and other "classical" causes, there remains an almost indefinitely large mass of material for

¹ Some students will regard even this remark as unduly credulous and will deny all such phenomena whatever. The point is of no importance at all for the purposes of this discussion. But as it is of some intrinsic interest I venture to state briefly my own view in passing. I, personally, consider that some "physical" phenomena do occur, although I can give no sort of explanation of them and am convinced that 99 per cent. of physical mediums—perhaps more—resort to fraud sooner or later. Paradoxically, but not illogically, it is my conviction that Kathleen Goligher's phenomena were fraudulent when I saw them in 1920 which chiefly confirms my opinion that they were genuine when I saw them in 1916. It is quite incredible to me that four years of practice, with unchanged personnel and an unsuspecting observer, should have resulted in so conspicuous and startling a deterioration in any fraudulent technique. If poor Crawford had not been too close to the trees to see the changes in the wood he might have been with us to-day. As it is, his labours are discredited and likely to be forgotten, whereas, in my considered judgment, his early work—notably, *The Reality of Psychic Phenomena*—is as worthy to be regarded as "a classic of the subject" to-day as when I first used these words of it (*Proc. S.P.R.*, Vol. XXX, p. 306). I do not say this now because I said so then—I have revised many opinions in my time and hope to revise more—but because I am very glad to be able to pay even so trifling and belated a tribute to the work and integrity of a man whom fate treated with an unconscionable harshness.

the explanation of which we must turn either to paragnosis or to coincidence.

In the next section I shall allow myself the luxury of giving a single example, from my own experience, which will serve to illustrate the kind of thing I have in mind. Let it be clearly understood that I neither attach any special weight to it myself, nor wish others to so do. I quote it because it is fairly typical of, I suppose, some thousands of other cases, except perhaps that it happens to lend itself rather unusually well to numerical assessment.

4

In December 1916 I had the first of my few sittings with that very well-known medium, Mrs. Osborne Leonard. I was, at that time, a wholly obscure convalescent subaltern, unconnected in any public way with spiritualism or psychical research and only beginning to take a rather dilettante interest in them. Apart from Mrs. Leonard's known and unchallenged integrity, established by many years of critically observed work, a substantial anonymity was preserved by making the appointment in the name of Mr. W. Smith, *tout court*, from the Royal Automobile Club, which remarkable institution was the home at the time in question of all Overseas Officers, in addition to its own already so numerous members.

In the course of the sitting, communications were received which purported to come from a cousin, to whom I was much attached, who had been killed in action in April 1915.

The following items were notable among many of no evidential value:

(1) His surname—we will call it Gedge—was definitely given—an uncommon occurrence, especially at a first sitting.

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(2) Unmistakable references to the game of billiards, which, when we were undergraduates at Cambridge, we played together almost to excess. These were given in such words as "He is showing Feda¹ a game you used to play together—a funny game—Feda can't quite make it out—you play it with a ball but you don't hit it—you *push* it with a stick".

(3) Unmistakable references to the Christian name—I alter it negligibly—of a lady to whom I had been engaged. The engagement having terminated in circumstances distressing to myself the name was of great significance to me at the time. Feda could not get the name as such; but she kept saying "he's showing Feda *roses*, heaps of *roses*—Feda doesn't know what it means, but it's *roses*".

Now the only interest of this kind of thing for us is the question of whether it is to be attributed to coincidence or to some form of paragnosis. The question of whether my cousin really had anything to do with it and of whether the form in which the remarks were presented was merely a dramatisation by Mrs. Leonard's subconscious mind is not relevant to this discussion.

We cannot assess the odds precisely, but we can make a fairly good shot and this is the chief reason why I have chosen this case as an illustration.

1. The name "Gedge" is not particularly common. A rough estimate shows that there are about 400,000 entries in the London Telephone Directory, of which 66 are—not "Gedge" but the actual name. Taking this as a guide we conclude that the chance of *guessing* the name correctly is about 1/6,000. But there are various complications which need not be discussed here, so let us call it 1/1,000 to be on the safe side.

2. I suppose that for one pair of young men who conspicuously play billiards together, there must be five who play each of the games of football, cricket or tennis,

¹ "Feda" is Mrs. Leonard's "control", who always talks in the third person like a child.

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two perhaps for hockey and golf and maybe another for the various other games there are—not to mention sports. It looks like a 20 to 1 chance, but let us rate it as 1/10.

3. It has just taken me eight and a half minutes to write down one hundred feminine Christian names out of my head; there must be very many more, but let us say that the chance here is 1/100.

Thus the chance of the combined event coming off by pure guesswork would appear to be $1/1,000 \times 1/10 \times 1/100$, or one in a million.

5

I do not want readers to attach one whit more importance to this purely illustrative example than they themselves feel inclined. It happens to be accurately reported, but that does not matter. What does matter is that anyone who chooses to look will find scores of cases just as good in the literature of the subject.¹

Equally, if they disagree with my assessment of the chances, they are welcome to cut my result down to 1/100,000 or 1/1,00, or even 1/100, if they like, without making much difference. The question is whether Mrs. Leonard, or any other reputable medium, scores a 1/100 shot, say, much more often than once in a hundred sittings.

The answer, to anyone familiar with the subject, is so overwhelmingly in the affirmative that the matter need

¹ Not to mention the "cross-correspondences", "literary puzzles", "book-tests" and other varieties of evidential material, which I do not propose to discuss here. The interested reader may refer, for a condensed account of these, to my *Foundations of Spiritualism* (Kegan Paul) in which I summarise the evidence considered in its spiritistic aspect.

not be pursued further here. Those who know nothing about it must either take the word of those who do or learn for themselves. Would-be criticism on the lines of denying this is so ill-informed as not to be worth the trouble of refuting. To adapt Professor Hogben's pleasing remark, emphasis on the point is but flogging a dead horse long after the live ones have got out of the sceptical stable.

I should not, of course, feel entitled to take this line so strongly if I had not already dealt with the contextual evidence in earlier chapters, by introducing what I hope will be regarded as a tolerably plausible hypothesis, or theoretical framework, in which to fit such facts as these. If the sacrosanctity of classical law were inviolate; or if, even, admitting that some deviations had been noted, we could think of no way of introducing a basis for one in connection with conscious behaviour; or if we were still faced with the antithetical mutual exclusiveness of consciousness and matter—then I should have been compelled to ask my readers to decide whether it is more likely that all apparent paragnosis is coincidental, or that classical law might go wrong. This is not the case; so that, although it is highly desirable that paragnostical phenomena should be established on as broad a quantitative basis as possible, yet their semi-quantitative status, even at the present time, amply justifies us in using them as material in the construction of our puzzle.

6

There are, however, one or two points in connection with coincidence and cumulative evidence which I think worth noting here as matters of general interest.

In cases of the type just described we are on fairly

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secure ground, for we can usually make at least a rough estimate of the chances involved. But very often, for example in telepathic or veridical dreams, this is not the case and the line is usually taken of saying that, although no single instance is coercive, the *cumulative* effect is overwhelming.

This seems to me to be very dangerous, for several reasons.

To start with, evidence is only cumulative, in this sense, if each individual item is intrinsically improbable—that is to say, less likely to occur than not—and if, in addition, the items occur more frequently than pure chance alone would indicate.

For example, I might get it into my head that the number seven is of great mystical and occult importance and likely, on this account, to intrude itself into experience whenever possible. Following this idea I might go to Monte Carlo and make a note of every occasion on which two sevens running turn up at the table I watch. To my delight I find that this happens no less than ten times in the course of my visit and I conclude that my theory has received support. But this is an altogether false conclusion, unless I also note that the number of observed *coups* is very appreciably less than 13,690—for two sevens running will occur, on the average, once in $37 \times 37 = 1,369$ *coups*.

Similarly, we must not attach importance to, say, veridical dreams unless we are prepared to give good reason for supposing, first, that the average chance of their being coincidentally veridical—i.e. veridical by accident—is $1/n$ and, secondly, that a good many more than m dreams out of $m \times n$ dreamed are veridical. We are too apt, I suspect, to guess the first part—if we think of it at all—and to assume the second. Thus if I were to dream that my uncle was murdered by a left-handed

Chinaman with a wart on his nose, and afterwards were to learn that he had been so murdered, I should conclude—probably rightly—that this was a case of paragnosis; but I defy anyone on earth to say what the chances in the case are! Less melodramatically, if we dream about a particular person and next day meet him in the street, or receive a letter from him, we note the coincidence as remarkable; but, if we do not, we forget the dream. The coincidences get recorded, the failures to coincide do not. Thus at least one-half of the evidence necessary to form a valid judgment is either lacking or, at best, very difficult to estimate. We must accordingly be very chary in speaking of the cumulative weight of such cases.

We may compare with this the fact that if at roulette five successive *coups* give 9, 9, 9, 9 and 9—or even 9, 10, 11, 12 and 13—we regard it as very remarkable, whereas a sequence such as 7, 29, 11, 13, 26 would pass unnoticed, although it is just as improbable as either of the other two. Similarly the sequence 18, 25, 11, 32, 4 would not excite comment, though it is of the form n , $n + m$, $n - m$, $n + 2m$, $n - 2m$; nor would 1, 6, 2, 1, 5, 0, although 162,150 happens to be 99,999 written in the scale of 9. I conjecture that in principle we could probably find some sort of form or law connecting any sequence of numbers we please, somewhat as we can reduce any periodic disturbance to a set of sine waves by Fourier's theorem. This suggests that it is only when the form of the connection between numbers is so simple as to be easily recognised that we account it remarkable. This does not seem a very good reason and I begin to wonder whether we do not sometimes attach more significance to coincidences than they deserve. The juxtaposition in time of two nines at roulette strikes me as remarkable, while that of a nine and a five leaves me cold. Intrinsically, however,

the two events seem just on a level and this would still be true if the roulette wheel had ten million numbers instead of thirty-seven. Applying the same reasoning to events in general it would appear that all juxtapositions thereof are equally probable; the coincidence of an event *A* with an event *B* (namely, a dream about *A*) is no more remarkable intrinsically than the coincidence of event *A* with event *C* (namely, a dream about something else). If this be sound we must be most uncommonly careful, to say the least of it, before we attach importance to any veridical dream or similar phenomenon.

There is almost certainly a screw loose somewhere here; I suspect it is this: that what I have said is perfectly true, but I have omitted to mention that it is just those events which are juxtaposed more often than chance alone would lead us to expect that we describe as causally connected. Thus we come back to our original contention, that veridical dreams are not to be considered as affording evidence for paragnosis, unless we can show them to be more frequent than chance alone would produce.

7

Similar considerations apply to other paragnostical phenomena and in particular to experimental telepathy. I must say a few words on this important subject, lest I be accused of neglect by the instructed and the sceptical alike.

At first sight it seems that it should be easy to obtain evidence susceptible to quantitative treatment, of which the value, that is to say, could be precisely assessed, by experimental methods. This is far from being the case, as I hope I can make clear in comparatively few words.

It is evident that if I draw a diagram—a pentagram,

say—on a piece of paper and ask someone else—who cannot tell by normal means what it is that I have drawn—to reproduce it, they are not very likely to succeed by guesswork alone. Many such experiments, by no means confined to the reproduction of diagrams, have been tried and have met with a certain amount of success. But the value of the success cannot possibly be estimated in quantitative terms, since no man can say what is the chance of such an experiment—an entirely “free” experiment, so to speak—being successful by accident. If it were to succeed a large number of times in succession—one hundred times, say—we should certainly conclude that chance could not account for the results; but this judgment, although I should unhesitatingly make it myself, would be made on a common-sense, not on a logical, basis and would accordingly be open to suspicion.

Similar considerations apply to all “free” experiments whatever, in which the question is of the form “*What is this?*” as opposed to “*tied*” experiments in which the form is “*Which* (of a known limited number) *is this?*” In particular they apply to that form of experiment, otherwise so valuable, in which broadcasting is employed and listeners are invited to report their impressions as to the nature of a series of objects exhibited in the studio. The results are interesting, but they can never be conclusive or even definitive.

It might be thought that this difficulty could easily be overcome by the simple expedient of substituting “*which*” for “*what*” in the question; that is, by the method of what I have termed “*tied*” experiment. What is easier, in principle, it might be asked, than to organise a broadcast experiment in which listeners should be asked—to take a dull example—whether cards drawn from a shuffled pack were black or red? “I am just going to draw a card

from the pack: I want you to note whether you think it is black or red: Now! . . ." and so forth.

Common sense tells us that as the listeners cannot possibly tell what the card is by any normal means, they are as likely to guess it right as wrong; in other words, the chance of any single guess being right is $\frac{1}{2}$. This being so, it is possible to obtain a formula showing the chance of, say, n guesses out of a total of N being right by accident, and this chance can be evaluated numerically for any given case. For instance, if we collected 100,000 guesses, of which 51,000 were right and 49,000 were wrong, the chance of this result being accidental would be about $1/200,000,000,000$. These would be good enough odds to satisfy the most exigent and it may be wondered why an experiment on these lines has not long ago been tried.

Quite a number of people, I believe, *quorum pars parva fui*, have fallen into this trap. The catch is that common sense, as so often, is misleading. The chance of guessing a card correctly is not $\frac{1}{2}$ but varies according to whether the card actually drawn is red or black. This is not because of any magical difference between red and black cards but because of the operation of what is known as *preference*. Most people have a preference for red; so that on the average they will not guess red and black equally often, but red rather more often than black. Suppose for the sake of illustration that this preference is of the magnitude of 3 per cent; then, on the average, 53 per cent of guesses made will be "red" and 47 per cent "black". So that, if the card actually exposed is red, 53 per cent of the guesses made will be right and 47 per cent wrong, even if no paragnosis be operative. This would not matter much if the effect were constant, the preferential gains and losses would cancel each other in a large number of

trials. But unfortunately it is clearly likely to fluctuate with mood, with fatigue and with a whole host of quite incalculable factors. Without going into details, which are complicated, it is easy to see that in cases where the influence of paragnosis is small—as it is likely to be in a broadcast experiment—the problem of detecting it is rather like that of detecting a two-inch tide in a heavy storm.

No doubt the technical difficulties will be overcome in time and I am sure I speak for all workers in this field, as well as for myself, when I say that helpful suggestions will be most gratefully received; but until this trouble is dealt with by some ingenuity of method, it will scarcely be practicable to place experimental telepathy on that broad statistical basis so much to be desired.

8

It is largely on account of the considerations advanced in the two preceding sections that I have preferred to rely here mainly on ostensibly spiritistic phenomena *considered in their paragnostical and not in their spiritistic capacity*. I have not adopted this policy in a craven spirit of disingenuous evasion, but on the principle of the limited objective. I do not deny that some mediumistic communications and the like are more or less—or even exactly—what they purport to be, nor am I here concerned to assert it; the point simply does not interest me so far as the argument of this book is involved—and not very much otherwise. I do affirm that they often provide most admirable examples of paragnosis and this interests me very much indeed. I wish that someone, with an encyclopaedic knowledge of the subject, a stringently critical mind and a pen more industrious by far than my own, would write a classic on

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Paragnosis as such, summarising all relevant phenomena with complete disregard to their supposed origin.

It is mainly the fact that mediumistic utterances smell so strongly of spirits that deters orthodox scientists from studying them; if they would only analogically hold their metaphorical noses and practise the scientific detachment which they preach, the recognition of paragnosis as a public fact would not be long delayed.

CHAPTER IX

THEORY OF PARAGNOSIS: IMPLICATION OF TELEPATHY: UNITY OF CONSCIOUSNESS

I

WHEN we turn from the status of the facts of paragnosis to the theories which have been put forward to explain them, we are confronted with as oneirodynic a farrago of jejune verbiage as any with which I am acquainted. From this it will be rightly conjectured that I do not find myself wholly in accord with the views which have been advanced on the subject.

For a painstaking account of these, made as interesting as the nature of the material permits, the reader may refer to Dr. Tischener's *Telepathy and Clairvoyance*, pp. 189-222. I shall confine myself here to a brief consideration of the popular view that telepathy "has something to do with wireless" and shall then give at once what I myself consider to be the proper way of regarding the problems involved.

The popular mind, so far as it can be said to have thought about telepathy at all, has been obsessed by the facile analogy with radio-telephony as affording an example of communication at a distance without any apparent connection between the persons concerned. This analogy I believe to be wholly misleading for reasons which I shall give in a moment.

My treatment of this part of the subject will be considerably shorter than I had originally intended; as has happened before in the course of writing this book, I have decided—now that I have come to the point—that

it is not worth the detailed analysis which I had projected. It seems so much better to mount and ride the live horse than to waste time over valedictory floggings of the dead.

2

The outline of the wireless theory of telepathy leaps to the eyes as soon as mentioned and may be approximately stated as follows: It is supposed that the body, or some part thereof—probably the brain, or some part of that, but it doesn't matter—acts as a generator of electromagnetic radiation, presumably either ultra-cosmic or infra-Hertzian as regards frequency—but this doesn't matter either.¹ This radiation is supposed to be modified in some way by the content of the mind of the "agent" (as the supposedly active participant in telepathy is called) so that the waves "represent" the "ideas" in that mind. It is further supposed that some part of the body or brain of the percipient is sensitive and attuned to this radiation, which is accordingly picked up and produces, in some unspecified fashion, the same or similar "ideas" in the percipient's mind. The word *induction* is often used and its vague suggestiveness serves to cover a multitude of discrepancies.

Now I do not propose to waste time exposing in detail the weaknesses inherent in this or any similar theory. I will content myself with pointing out the respects in which it is inconsistent with observation and incredible in principle.

¹ It is no use suggesting that the radiation may be other than electromagnetic. Unless it is of some grossly material character like sound waves in air or seismic waves in rock, which is clearly out of the question, it must be electromagnetic if it is to have anything to do with the physical world at all; indeed we might almost say that that is what we mean by "physical world".

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As regards the first, anatomists and physiologists will be only too pleased to testify, with greater authority and—I doubt not—with even greater passion than I, that there is no bodily organ, whether a part of the nervous system or not, of which the structure even remotely suggests that it could, should, would, or in any imaginable circumstances might, act as a generator of electromagnetic waves of the penetrative power required.¹ If anyone were to press the point it would certainly be to my friendly opponents the mechanistic biologists that I would refer him.

There simply is no such structure, nor any trace of one; nor has anyone made any suggestion, I think, as to the source of the energy requisite for the transmission. Those who contend that “there must be” such an organ, *because* telepathy could not otherwise occur, are merely begging the question. Similar considerations, except with regard to energy, apply to the “receiver”.

Next we may note that all free radiation must conform to what is known as the inverse square law; that is to say, if you double your distance from the source the “signal strength” is reduced to one quarter its original value; at five times the distance it is a twenty-fifth and so forth. Now, although we know all too little about telepathy, one thing does seem clear, namely, that distance has nothing to do with it.² Spontaneous and experimental phenomena alike indicate pretty plainly that telepathic paragnosis is as likely—or unlikely—to take place over a distance of a thousand miles as over ten feet.

¹ Incidentally, I suspect that the whole theory could be irretrievably damned on the question of penetrative power alone; but I am insufficiently familiar with the subject to speak with assurance.

² Perhaps this is even more marked in the case of other paragnostic phenomena.

This alone would be sufficient to knock the bottom out of any radiation theory, unless we complicate it by postulating some directive mechanism to concentrate the radiation into a beam. But in this case how is the beam directed; or—great thought—is it a case of an automatically revolving beacon, so that the percipient only catches the radiation when the beam happens to swing in the right direction? Is this why telepathy is so erratic? I trow not. Such an “explanation” is altogether too reminiscent of that stage of thought at which, as Eddington says somewhere, we did not feel that we understood anything unless an engineer could make a model of it. We know tricks worth two of that nowadays and it seems far more likely to be true that nothing of which an engineer could make a model is of any fundamental importance whatever.

3

Far more serious than the foregoing objections, which are of a purely mechanical nature, so to speak, are considerations relevant to the underlying principle of the process supposed to be involved, which is essentially that of all kinds of mundane communication.

The salient characteristic of all such processes is the use of symbols, of one kind or another, in accordance with an explicitly or implicitly agreed *code*.

This is obvious enough in the case of the transmission of messages by means of an artificially constructed code, such as Morse, or the elaborate letter and number codes evolved for commercial, diplomatic and military use. It is equally true, if less evident, of the ordinary processes of speech or writing. A word, whether as a mark on paper or a disturbance in the air, is merely a symbol

and is useful for purposes of communication only if and in so far as its referent is agreed by both parties to the communication.¹ Unless we adopt some preposterously crude conception of "ideas" hurtling through the air like bullets, from one mind to another, we are forced to suppose that some process of encoding and decoding goes on—*automatically, unconsciously and with respect to an unknown code*. I do not think that I can disprove this, but I certainly cannot believe it. The same applies to what appears to be the only possible alternative, namely, the supposition that every "idea" is associated with a particular cell or group of cells in the brain, that these cells emit each a radiation of characteristic wave-length, that this radiation stimulates the corresponding cell in the percipient's brain and that this causes the same "idea" to emerge into consciousness.

Very uphill work is it not? The machinery seems to be getting terribly cumbrous. Quite. Do you believe a word of it? No? Neither do I.

I doubt, indeed, whether those who put forward such suggestions really believe a word of them either. This is not unkindly meant; after all, if you are convinced of telepathy as a fact you must try to say something, even if it be not very convincing, about the kind of way in which it might be supposed to occur. But the "wireless" type of theory strikes me as a most miserable *pis aller*; let us throw it all overboard and start afresh.

4

There is a striking resemblance between the horrid elaborations and improbabilities of radiation theories of

¹ I neglect such symbols as "Grrrrrh!", which is probably almost universally intelligible when spoken; they are more or less onomatopoeic and therefore quasi-referential.

telepathy and the efforts, already noted, which scientists used to make to construct a mechanical ether, and I find it difficult to suppose that the sponsors of such constructions ever thought that the ether was "really" made up of vortex rings or gyrostats.

These efforts were abandoned not so much because none of them succeeded very well—human ingenuity had not exhausted its powers of complication—as because the ether itself was found to be unnecessary. Let us see whether we can solve the telepathic problem in the same kind of way.

First let us state it in the form in which it is, I suppose, usually conceived. It runs something like this—excuse the italics:

How is it that an *idea*, which originates in a *mind* which is in Birmingham, say, can be *transmitted* so as to appear in another *mind*, which is in London?

The essence of my treatment lies in the contention that any question couched in terms at all like these raises a false problem to which no solution is necessary. Those who can only think of the matter in terms of "ideas" floating about "in" a "mind", like gold-fish in a bowl, do not qualify for the ensuing discussion; they should apply themselves first to the problem of how the apple gets inside the dumpling.

If we rid ourselves of hylomorphisms about ideas and minds, we may improve on the foregoing by putting it in the form

How is it that one mind, or consciousness, can act on another, regardless of the intervening distance, otherwise than by means of materially or quasi-materially transmitted signals or symbols?

This is, I think, a fair statement of the problem at the level of ordinarily intelligent discourse.

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Now, so soon as it is stated thus, it becomes clear that we are confronted with a special case of the general problem of "action at a distance", which has given so much trouble to metaphysicians from time immemorial. It was this that forced physicists to try to construct mechanical ethers for the purpose, among other things, of transmitting electrical, magnetic and gravitational pulls and pushes. The difficulty arises, of course, from the supposedly self-evident or axiomatic proposition that "a body can act only where it is". Assuming this to be true, it is clear that one body can only act on another either by being in contact with it, or by firing projectiles at it, or by acting on some "medium" (the ether) in contact with both. True *actio in distans* across "empty space" is rightly described as unthinkable.¹

In the old days we were accustomed to treat such self-evident axioms with a cringing servility and seek—like pusillanimous politicians—for some "formula" which would not affront them. Nowadays we are made of sterner stuff. Perhaps we get it from Australia where, I am told, the plan is to "get up early in the morning with a clear conscience; look every man straight in the eye; and tell him to go to hell!"

At any rate we will not be intimidated by the axiom

A thing acts only where it is.

We will apply to it the treatment meted out by school-boys to recalcitrant clocks, namely, turn it upside down, give it a good hard knock and then shake it. The bits and pieces then arrange themselves in this far more helpful form

A thing is only where it *acts*.

¹ This, of course, is true only so long as any meaning is supposed to attach to the term "empty space".

This is not really so revolutionary as it sounds; very little thought should serve to reconcile us to it.

5

The axiom thus rearranged is only startling because, first, it is unfamiliar and, second, because I have retained the word "thing". And we have already seen that things-in-themselves are no more than fictional pegs on which to hang descriptive remarks involving properties, predicates, actions and the like. If we say "actions are only where they act", the proposition becomes a truism. But it is clear that, if there be no "things", the word can only have been put in to make it more difficult, like the snake in the story.

It may sound odd, but apart from purely conversational remarks, it seems impossible to attach any intelligible meaning to the statement, for example, that "the moon is in the sky". The statement is meaningless because the symbol "the moon" has no referent. But we say that the moon acts on the sea to produce tides; are we then to say that the moon is in the sea? No: but only because we ought not to talk at all, save for purposes of poesy and romance, about "the moon".

It is interesting to speculate as to what a blind but intelligent race would think about tides. They could easily discover tidal phenomena; for instance, by sitting too long on the beach and getting their feet wet; but they could hardly ascribe them to or associate them with a bright patch in the night sky. Presumably they would start by saying that a particular kind of rhythmic motion was one of the properties of sea water, or, at an earlier stage, that there was a god breathing under the sea. But the property-of-sea-water theory would break

down as soon as they isolated some in a bucket and found that it did not detectably move. The heaving god, or some more sophisticated seismic version, would have to go as soon as they detected tides in a large shallow lake and found that the bottom did not heave. Similarly, a tilting earth theory would be hard to reconcile with the immobility of undisturbed pendulums. Possibly they would note the concomitant decrease of motion and salinity with increase of distance from the mouth of a river and wonder whether one was the cause of the other; possibly they would note that tidal motion was observable only in large expanses of water and decide that "being very extended" was a public predicate with which the non-classical phenomenon of surging was correlated! But, whatever they did, they would be very much more likely to locate the causes of tides in the sea than in the sky. And so far as this aspect of lunar activity is concerned it is certainly the more sensible view.

Perhaps the point will be a little clearer if we look at it from a slightly different angle. It is almost a commonplace of elementary science that every particle of matter in the universe affects, gravitationally, every other particle; so that it is literally true to say that at my nod—or yours—the stars reel in their courses and the host of heaven trembles. As I flick the ash from my cigarette Sirius shivers and the nebulae falter in their flight. Similar considerations obtain with respect to the electrical field set up when I rub my fountain pen on my coat sleeve, or about any other influence whatever. Now it would be extravagant to say that my cigarette ash is *in* Sirius, yet there is no doubt that its gravitational influence is there in a perfectly valid sense and, in the same way, with other attractions and repulsions or what we may call influences in general we can legitimately

frame formal relationships connecting their intensities with spatial coordinates. But it is senseless to attempt to localise such an influence in one place to the exclusion of others. And if we strip away all the influences by which our supposititious "things" act and by which alone they are known, what is left to be located? The *Ding an sich*; *alias* Nothing.

I feel myself in real difficulties here. I am most anxious that the point I am making should be clearly understood and fully accepted, for it is the most important of any I have yet raised, except that of discarding things-in-themselves, which is inextricably bound up with it. So long as we cling to the thing-in-itself of everyday illusion so long shall we go on imagining that that "thing" has a "location-in-itself", so to speak, apart from the locations of the phenomena¹ which, in truth, make up the "thing".

Yet I feel that, if the point be not recognised and conceded almost as soon as stated, there is little to be gained by labouring it. There is always a hope of explaining the complicated, but who shall simplify the simple?

6

It is to be expected that the acute reader will already have discerned whither I am trending. My argument is that just as it is impossible to localise things-in-themselves—because there are none—and possible to introduce spatial terms into discussion only by reference to where

¹ These "locations of phenomena" themselves reduce, of course, to relations between various "pointer readings"—as of scales, theodolites, balances, magnetometers, etc.—or, psychologically, to relations between certain modulations of consciousness—e.g., visual, tactile—and others—proprio-centric, oculo-motor, etc.—from which our conceptions of space and location are derived.

influences act, so it is absurd arbitrarily to localise consciousness as being *some where* and then to puzzle ourselves as to how it contrives to act *some where* else. This is exactly what I mean by a false problem and to readers who complain that I am giving no account of how an idea in the mind of George gets transferred to the mind of Percy, I reply that I am omitting to do so because nothing of the kind takes place.

Things—if at a relatively low level of discourse we may use the word “thing”—are where they act; minds—if at a similar level we may use the word “mind”—equally are where they act. If the mind of A interacts with the mind of B it is because they are coincident.

Risking a somewhat violent compression, we may say

Telepathy comes about, not by transmission of ideas but by community of consciousness; not by transference of a Thought, but by identity of the Thinkers.

7

This conclusion is of very great importance. Not only will it enable us to think of telepathy in intelligible and by no means fastastic terms, but it will enable us to coordinate a whole host of phenomena ranging from mystical experience to the psychology of crowds.

On the other hand it introduces difficulties of its own which I must not shirk. Fortunately these do not appear insuperable; on the contrary they serve to enforce further conclusions effecting an extensive unification of theory and economy of hypothesis.

As usual we are embarrassed by the forms of language which alone are available for purposes of discussion, because we are obliged to use metaphors and analogies—mostly of a spatial character—which are not really

applicable and are likely, unless we are very careful, to impose paralysing limitations on our thought.¹ We must accordingly tread with the utmost wariness, keeping a sharp lookout for verbal pitfalls.

Hitherto I have freely used the word "consciousness", partly because it has seemed to me to be rather less misleading than the word "mind", but mainly because I have been anxious to keep the cardinal fact of "being conscious" well in the forefront of our thought.

Also, I have paid attention almost exclusively to the relation between "being conscious" and "the external world", with a view to showing that the latter is a fictional construct, while the former constitutes the only reality known to us. As Eddington has it "There is no question about consciousness being real or not; consciousness is self-knowing and the epithet real adds nothing to that".

But there is another side to the story, namely, all that is suggested by the terms "sub-liminal", "sub-conscious" and "unconscious mind". If it be true that the content of our consciousness—or, better perhaps, the constitution of the passing thought—varies, to a great extent, *as if* there were an external world of things-in-themselves of

¹ For example, I am about to discuss certain questions connected with what is commonly known as "the subconscious mind". This, nowadays, is a very familiar and very valuable conception and we are quite accustomed to reading and speaking of "the depths of the sub-conscious" and to referring to different "levels" thereof. But such forms of words, invaluable as they are in enabling us to set our ideas in order, inevitably suggest a spatial arrangement in which remoteness from consciousness is in one direction only, i.e., more or less "deep". This might easily lead us to imagine that there might of necessity be a closer relationship between "ideas" which are "at the same level" than between those which are not. This would clearly be nonsensical, but it serves to show the kind of way in which the form of a metaphorical mode of talking may tend to impose itself upon us.

which we perceive the appearances, it is equally true that it also varies, to a great extent, *as if* there were an internal world "below the threshold of consciousness" from which "ideas are thrown up" or, better, from which influences play a part in determining the content of the conscious field. From the one side proceed our sensory perceptions, from the other such modulations as those we call memories and (in part) imaginings.

I need not elaborate these conceptions, which are familiar enough; nor does it matter whether I have stated them with academic exactitude, provided I have brought out the contrast between the two domains divided, as it were, by the plane of the passing thought.

The point is this: I have made out, I hope, a good case for rejecting the external physical world as an ultimate reality and for conceding it a fictional status only; are we to do the same thing with "the sub-conscious"? And if not, why not?

It is not easy even to state clearly, and without undue prolixity, the problem which arises here. Colloquially speaking, it is a question of whether we are to attribute the similarities between different fields of consciousness to a material or a non-material cause. But this is a very loose way of talking and needs a good deal in the way of both expansion and definition.

The situation is somewhat as follows: We have reason to believe that a large number of people are conscious and that they are conscious in the same sort of way. Further, all the evidence, namely, the behaviour observed by each observer, goes to show that the content of each conscious field varies in substantially the same manner in the same circumstances. The varying content of the streams of consciousness of a number of people watching the same cinematograph film, or observing the

same view, for example, would appear to be substantially identical at any given moment. The word "substantially" is clearly very necessary because, apart from slight variations due to differences of position, there will also be variations arising from degrees of concentration and the emotional concomitants aroused; but the experiences of the observers will be identical in their main features.

The problem is to account for this substantial identity of conscious content.

It would appear that there are three main ways of doing this, namely:

- (A) We may suppose it to be purely fortuitous; that is to say, whenever several fields of consciousness are ascertained to have (substantially) the same content, we attribute the agreement to sheer coincidence. This involves so preposterous an improbability that we need not scruple to reject it at once.
- (B) We can suppose that there is an external linkage, if I may use the term; that is to say, that the unifying principle, so to speak, is to be found in an autonomous external world of things-in-themselves. This is the usual procedure.
- (C) We can suppose that there is an internal linkage: that the observed unanimity between the various fields of consciousness is determined not from the side of the so-called physical world, but from the side of the so-called sub-conscious.

By way of a helpful, if clearly incomplete, analogy we may compare the situation to the discovery that a large number of loud-speakers are all playing the same tune, subject to minor distortions introduced by the peculiarities of each. Rejecting the suggestion that this is due to chance, we have to decide whether it is due to the

functioning of an external broadcasting station or to their all being wired together.

The second and third suppositions noted above are not, of course, mutually exclusive. Both might be true, but in the interests of economy we must not invoke both if we can make one serve our purpose. One or other, however, is obligatory, since the first is frankly incredible. Of the two remaining alternatives I have already examined one at some length and have found it wanting; we must now consider the credentials, comparative and absolute, of the other.

8

In the sentence with which I introduced the topic of the sub-conscious, I deliberately spoke of the passing thought varying, in part, *as if* there were an "internal world". I did this not because I consider that internal world to be fictional, as the external world is, but because I wished to set the two conceptions as much on a par as possible in the first instance, lest I should be suspected of quietly and disingenuously assuming for the one an order of reality which I deny to the other. But the fact that we can truthfully say that something or other happens *as if* something else were so is no warrant for denying that the latter is actually so. The islands of an archipelago, for example, retain their relative positions *as if* they were rigidly connected below the surface of the water: and they are.

The answer to the problem of whether the conception of a subconscious mind is fictional or not is, I think, to be found in the reflection that the ontological status of anything inferred is the same as that of the data from which the inference is made.

Adams and Le Verrier, for example, inferred the existence of the planet Neptune from the observed perturbations of the planet Uranus, and Neptune, sure enough, proved to be a "real" denizen of the physical world. Similarly we infer the existence of dark stars and other not directly observable objects and (rightly) have no doubts as to their (physical) reality.

But we have seen that the physical world as a whole, regarded as a congeries of things-in-themselves, is not, and cannot be, inferred from the modulations of consciousness which alone we directly experience. Thus Neptune-in-himself, so to speak, is a fiction among other fictional things-in-themselves, though real enough at the physical level.

In contrast with this the conclusions we draw about the subconscious mind are, or should be, inferences directly drawn from modulations of consciousness and therefore enjoy the same status as these.

Let me get this clear even at the cost of partial repetition.

The word "real" is legitimately used, as a matter of convenience, in a relative sort of way, though in colloquial parlance it literally means nothing at all. Speaking loosely, I may say, for example, "This is not a real egg" as a brief substitute for "Although this object possesses certain properties which are to be found in the schedule whereby the class 'eggs' is defined, it lacks others and is therefore not a member of that class". Strictly, I ought to say "This is not an egg", *tout court*. At the physical level, in fact, the word "real" need never be used; when it is used it can be neither less nor more than a synonym for the coexistence of all those properties (*alias*, pointer-readings, *alias*, modulations of consciousness) which constitute the referent of the noun it qualifies.

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It is a redundant affirmation, for the words "this is a real flower" add nothing to "this is a flower".

This should make clear what I mean when I say that the subjects of (correct) inference in the physical domain are real at the physical level and enjoy the same status as the data on which the inferences are founded.

And, similarly, inferences from observed modulations of consciousness themselves enjoy the same status as these, namely, that of the ultimate reality known to us, or—if you prefer it, as I incline to do myself—the ultimate indisputability. Whatever else may be disputed or argued about or denied, the immediate content of consciousness, whether yours or mine, cannot be; it is self-evident, self-knowing, self-checking and self-dependent, unassailable, incontrovertible; and that is what I have in mind when I say that it alone is ultimately real for us.

I submit, therefore, that in so far as the conception of the subconscious mind is made up of rigid inferences from experienced modulations of consciousness, we are entitled to regard it as real—existing, that is to say, as indisputably as the modulations from which it is inferred. It is as really real at this higher level as the subjects of physical inference at the physical level.

But we must not forget that, as soon as we begin to talk *about* the subconscious mind, its properties and its mechanisms, we are almost certain to introduce fictions (e.g. Freudian censors) to facilitate our work. This will do no harm provided we do not mistake their nature.

9

I fear my readers must have found the preceding section almost as wearisome as I have. I judged it to be necessary because, without it, I should almost certainly have

been accused of committing precisely the offence against which I have inveighed, namely, treating as a matter of fact a conception which is strictly no more than a fiction.

As it is, I think we can talk about the subconscious mind with confidence, although I should be the last to pretend that my discussion of its credentials is in any way complete.

The difficulty, or rather the danger, is to be found in deciding to what precisely the term "subconscious mind" refers. It is easy enough if we are content to treat "ideas" as "things" and to think of them as popping in and out of a kind of storehouse like stage demons and being moulded by "forces" operating therefrom; but this sort of thing, though useful enough for certain purposes, is inadmissibly crude. Alternatively, we may play for safety by using the term in a purely descriptive fashion as a label whereby we identify a particular set of phenomena; but this is tantamount to denying all reality to the referent of the symbol.

The trouble is that having insisted (rightly, as I believe) that modulations of consciousness are the only reality, it seems scarcely legitimate—despite the argument of the preceding section—to claim equal status for anything unless it forms part of the content of some consciousness.

However, there can be no better motto for philosophic thinkers than *Ubi fas et gloria ducunt*, so we will accept the conclusion to which our reason has forced us and enquire into the question of what consciousness is conscious of the content of the subconscious!

The answer is pretty clear; we must infer a Universal Consciousness of which individual consciousnesses are fragments, offshoots, local centres, or something of that kind.

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This idea is not nearly so fantastic as it may appear at first sight and is certainly of a respectable antiquity. It is a view which many, if not all, idealistic philosophers of the classical tradition have found themselves forced to adopt and I am not aware that it has ever been refuted except—if such can be called refutation—by crude bludgeonings of the Johnsonian type. The philosophers concerned have found it necessary in order to account for the apparent continuance of so-called material objects when not present to any individual mind and they have often spoken of such objects as existing “in the mind of God”. We may compare Sir Arthur Eddington’s conclusion¹ that “Not once in the dim past, but continuously by conscious mind is the miracle of the Creation wrought”.

I am not myself sure that this is necessary, for it seems possible that the quality of persistence in question may be no more than a name for one of the sets of formal relations characterising those modulations of consciousness which we describe as appearances of matter.

But I am quite sure that something of the kind is necessary in order to account for the phenomena of sub-conscious mental activity in general and for paragnosis in particular. And I certainly think that the conception of God as a Universal Consciousness, including *all* that is, is more acceptable than that of something very like Mr. Gladstone—but perhaps not quite so much so—which bulked so large in my own upbringing.

The phenomena of multiple personality deserve at least a passing word here, for they show clearly that two or

¹ *Loc. cit.*, p. 241.

more individual and apparently distinct overt consciousnesses can share a common subconsciousness—sometimes in turn, more rarely simultaneously. Introspective data are, so far as I know, almost completely lacking;¹ but I have little doubt that (in well-defined cases at any rate) each such personality is as sure of its own discrete and autonomous individuality as you and I are, or at least questions its discreteness and autonomy as little as we do. I should be sorry to have to prove this at all rigidly; but I am confident that those who are most familiar with the literature of the subject (including those cases of mediumistic “controls” which seem likely to be secondary personalities) will agree that the contention is consonant with the facts and that these contain nothing against it.

And if this be so, if it be possible for what we should call a single personality to split into two or three distinct and self-conscious individuals, there is clearly no limit in principle to the extent to which the process might be carried; so that there seems no objection, on psychological grounds, to the supposition that each individual is, if I may use the term, a sub-personality of the Universal Consciousness.

Thus, in a very real sense, “we, being many . . . are every one members one of another”—superficially separated from, yet at bottom integral with the Universal Consciousness, in which we and all things “live and move and have our being”.

II

We have strayed far from telepathy, but I am not writing these chapters in order to explain this or any other

¹ The case of the Rev. T. C. Hanna is a partial exception.

paragnostic phenomenon; on the contrary, I introduced paragnostic phenomena to serve the purposes of this book, notably to provide positive reasons for adopting the hypothesis of an underlying unity of consciousness as affording a framework or ultimate constitution for the universe other than the fictional world of materialistic thinkers.

We accordingly conclude that a common subconsciousness is both logically permissible and observationally necessary.

So far as telepathy is concerned, the suggestion that it takes place through, or by virtue of, the subconscious (the subliminal of Myers) is coeval with intelligent study of the subject, though I do not think that previous writers have insisted, as I have done, on the substantial coincidence or identity of the "minds" concerned.

The following passage from Dr. Tischener's book is relevant:¹

. . . the idea suggests itself . . . that the subconscious mind—to make use of a spatial image—is not so clearly separated from its surroundings, but represents a mental field which is connected with the non-individual or super-individual mind. If we descend from our surface consciousness we gradually reach subconscious mental regions which cease to belong to a single individual—as, when we follow a water-course into the interior of a mountain, we reach regions where we lose sight of the single stream but where water pervades the ground all around us. These very deep layers of the subconscious mind would thus share in a non-individual or super-individual mind and so have a knowledge of things which are quite unattainable and incomprehensible to the individual mind.

Speaking for myself, I should not regard even these regions as "very deep" save by comparison with the "surface consciousness". They would represent the level

¹ *Loc. cit.*, p. 219.

of an important group consciousness perhaps, but would be far removed from the ultimate Universal Consciousness. But in such contexts as these, we must remember the warning in the note on page 223 above.

We may also compare the following:¹

. . . Kohnstamm . . . has lately tried to prove that in the deepest hypnosis a stratum is reached which is beyond the individuality and the personality. His subjects maintain that in the deepest hypnosis they can dive down to strata of their subconscious minds which are impersonal. The utterances of this deepest layer are of general applicability and no longer have to do with the person in question or his characteristics . . . Kohnstamm maintains that he has reached the universal, pure, super-individual, absolute subject.

Precisely the same comments apply to this as to the preceding quotation, with perhaps greater emphasis. Finally we have²

Driesch draws our attention to the fact that we only know mind empirically as an individual mind; this individual mind is spread over different individuals as on islands. No bridges seem to go from one to the other; a conclusion which is most extraordinary, indeed incomprehensible, if we had to accept it as final.³ If there is really a super-individual or collective mind . . . then this extraordinary isolation of the individual mind ceases to be so strange. For if we accept this hypothesis the individual mind will lose its isolation and it becomes comprehensible why the mind is so homogeneous regardless of its isolation,³ and the origin of the individual minds would cease to be problematical as they would all come from the common reservoir.

I do not happen to care overmuch for the precise wording used in the last quotation, but there can be little doubt that Professor Driesch has substantially the

¹ *Loc. cit.*, p. 221.

² *Loc. cit.*, p. 220.

³ Compare the problem of Section 7 above.

same conceptions in mind as I, and the presentation is certainly graphic enough.

12

We may summarise the latter part of this chapter as follows:

Many thoroughgoing idealistic philosophers have rightly maintained that "ideas"—modulations of consciousness as I should prefer—are the only reality. This contention cannot be controverted, but it has the disadvantage that it isolates every individual in a private world of his own and presents us with a plurality of discatenated consciousnesses between which the observed or inferred agreement is preposterously improbable.

Hitherto we have sought to establish connection between one consciousness and another by the fiction of an external world of physical objects in which your modulations of consciousness and mine find common ground, regardless of the fact that this world is not inferable from experience.

I contend that all this can be cut out and rendered superfluous by the conception of a direct linkage between consciousnesses *via* what is commonly termed the subconscious mind and a collective or Universal Consciousness. This conception has the further merit of being agreeable, as I think no other is, with the observable facts of telepathy.

Descartes was thus very nearly right when he made the axiom *Cogito ergo sum* the starting-point of his philosophy.

Being conscious is indeed the indefeasible fact, ignoring which all speculation is void; but Descartes, by insisting on the first person singular—*I* think, therefore *I* am—created an ego-centric predicament from which there

is no escape, which also is bound to lead to problems which are insoluble precisely because they are false.

Very pertinently does Vaihinger remark:¹

The so-called riddles of the universe can never be solved, because most of what appears puzzling to us consists in contradictions created by ourselves, and arises from trifling with the mere forms and shells of knowledge.

In days to come we may perhaps be able to write the total content of ultimate consciousness as a kind of glorified tensor and to derive from it by strictly logico-mathematical processes the coefficients of Einstein and their psychological analogues alike—the formal relations between these constituting the Laws of Physics and of Thought; but this is far distant.

In the meantime, faithful to the traditions of a fast vanishing Latinity, we may, I fancy, best sum up the Universe in the two words

Cogitator cogitat.

¹ *Loc. cit.*, p. 38.

CHAPTER X

THE UNIVERSAL CONSCIOUSNESS AND MYSTICISM

I

THE importance of the considerations developed and defended in the last chapter can hardly be exaggerated; but in order to complete my work, so far as is practicable in a book of these dimensions, I must extend them greatly in a direction which we have not yet explored.

We have come to the conclusion that the apparent isolation of your consciousness from mine is no more than superficial and have surmised that if we could penetrate sufficiently deeply into the subconscious mind we should find an underlying unity. It is as easy to distinguish between my surface consciousness and yours as between one mountain and another; but to regard them as altogether isolated is as erroneous as to deny the interjacent Earth.

For practical purposes, of course, it is usually desirable to keep these distinctions clear. When I meet a tiger in my walks abroad, I find it of the utmost importance to maintain both in thought and practice the discreteness of our identities; otherwise I am likely to achieve unity with the tiger in a manner more satisfactory to that deserving beast than to myself. Broadly speaking, the same applies at the mental as at the physical level, for it might be awkward to become saliently "tiger-minded"; but such practical reservations do not invalidate the general conception.

On the other hand there is a sense in which we can

and habitually do mingle our personalities. Whenever we so laboriously communicate with each other through the roundabout methods of speech and writing, I add some of your experience to my own stock, or *vice versa*, yet you do not feel less you, nor I less I, as a result. On the contrary, the consciousness of each may well be enriched and enlarged, not weakened or circumscribed, by the intercourse and the effect would be enhanced if a less cumbersome mode of exchange could be employed. If, for example, by some process of dissociation under hypnosis or the like, you and I could be put into complete telepathic rapport, it would seem that you might absorb the whole of my experience and I the whole of yours without the sense of individuality being at all diminished.

Now, this kind of thing is clearly going on every moment of our waking lives—and very possibly in sleep also. It is not only by deliberate communication with other conscious beings that such enlargement of consciousness is brought about, but through every contact we make with the world. Some may be more profitable than others, but all enrich.

Truly enough did Tennyson write

I am a part of all that I have met
 Yet all experience is an arch where thro'
 Gleams that untravelled world whose margin fades
 For ever and for ever as I move.

Or, even better, we may negligibly amend a dictum of Krishnamurti and say

The object of all experience is to remove the illusion of separateness.

The foregoing remarks will serve at any rate to introduce the idea of the enlargement or enrichment or expansion of consciousness without loss of individuality—or the sense of I-ness, to use a term which in some ways I prefer.

But the processes of normal communication and of general experience which we have mentioned are respectively indirect and slow, so that it seems natural to enquire whether there is any reason to suppose that extension of consciousness, of the general kind we have been considering, ever takes place and unity correspondingly is realised on a more heroic scale among specially constituted persons or as a result of special efforts.

I think there can be no doubt whatever that this is the case and that it is attested by practically the whole body of what I may broadly term mystical experience.

I have no intention of stating and defending any hard and fast definition of mysticism here; few readers will confound it with the mysterious, the secret or the obscure and I need not seriously quarrel with the dictionary rendering of “a tendency of religious feeling marked by an effort to attain direct and immediate communion with God”. Colloquially, if slightly cynically, one might say that mysticism is religion with the nonsense left out; that is to say, the mystic regards the details of creed, ritual, dogma and organisation as of quite secondary importance and concentrates on the direct personal relationship between himself and Deity.

But I do not think I shall be wrong if I say that the primary and all-dominant motif of ~~mysticism~~ is *union*. It is not worship of God, or obedience to God, or even

love of God, though all these are indispensable in their places. It is rather that by transcending all physical, emotional and intellectual limitations there is ultimately to be achieved an actual identification *with* God. So long as "obedience to", "worship of", "co-operation with" or similar conceptions persist, there remains an implication of duality which it is precisely the aim of the mystic to abolish.

3

Within the wide domain thus indicated it is natural that many varieties of mystic are to be found. But they are all alike in this, that their utterances deal almost exclusively with the process whereby union is achieved and the transformation which accompanies its attainment. The images may vary but the theme is unchanging; the saints of all races and in all ages ransack their vocabularies and strain the resources of their several languages to portray the enlargement of consciousness which increased realisation of unity involves.

Yet despite this great measure of unanimity it seems possible to distinguish two main schools, the differences between which are worth noting for our particular purposes.

These schools may be broadly referred to as the Eastern and the Western (or Christian) respectively and their members appear to have developed along slightly differing lines in a manner determined by what may be called their theological traditions.

I am on delicate ground here, with which also I might advantageously be more familiar, so that I necessarily speak with diffidence; but I have the strong impression that the difference is important and can be fairly expressed in the following terms.

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The Western, or Christian, mystic inherited from the Judaistic antecedents of Christianity a conception of God far more concrete, personal, anthropomorphic and distinctly imaginable—if I may put it so—than his Eastern counterpart, whose traditions are imbued with subtler and less tangible ideas of the absolute, indivisible, attributeless and formless One. It is clear that the latter conceptions, however metaphysically superior they may have been in the first instance, are likely to be refined away until, for ordinary thought at least, there is virtually nothing left; and this may account for the tendency to interpolate a host of subsidiary deities, or variform manifestations of the One, between human consciousness and the supreme Divinity.

Be this as it may, there seems little doubt that Eastern mysticism lays more stress than does Western on “the unity of all life” and on the realisation of this as a definite stage in the expansion of human consciousness. The typical Western mystic, it seems to me, tends to recognise God and Man, but virtually nothing between; while the Eastern thinks more of the Universal Life, within which he takes cognisance of innumerable orders and hierarchies of sentient, part-sentient and hypersentient beings. Thus, while the Western mystic seeks what I might almost call an “all or none” consummation of his ardours, the Eastern envisages a more gradual and progressive development—continued, maybe, through many lives—towards the ultimate goal of union with the All-in-One.

I cannot help thinking that, technically, the Eastern mystic (if I have correctly represented the characteristics of his thought) has rather easily the best of it, inasmuch as he avoids very many crudities and discontinuities in his scheme of things which seem inseparable from the Western view.

I am well aware that many people, whose approval I should prefer to retain, will take grave exception to my identifying, in this connection, the referent of the word "God" with that of the words "Universal Consciousness"; for these last may appear to them as cold and uninspiring as a differential equation. Others, perhaps, will begin to murmur "mere pantheism", falsely supposing that a doctrine can be damned by being labelled. To these I would reply that, if and in so far as their objections are on the ground that my conceptions are derogatory to the dignity of Godhead, they are guilty of two errors; first, of begging the question, in that they assume in advance the nature of the Consciousness we are discussing, and, second, of seeking to belittle their own Deity by contending that He is in some sense excluded from His creation.

Actually it is probable that the distaste which the suggestions I am advancing are apt to arouse in orthodox circles is due rather to the *vis inertiae* of habit-hardened thought and to sentimental predilections than to reasoned dissent. It is natural, if deplorable, that a highly "personal" Deity, in some degree of like passions with ourselves, should make the greatest appeal to the rank and file of mankind, but useful as such a presentation may be for Salvation Army audiences it is definitely unsatisfying for any who attempt more sophisticated thinking. Most of us, it is true, have travelled far from the baby-burning blasphemy of the late Dr. Isaac Watts, but I do not think it unfair to say that the personalness of God is still intimately connected with our belief in His potentialities for anger, sorrow, rejoicing, preference,

jealousy and even vengefulness. Yet all of these are in the nature of petty limitations incompatible with any advanced conception of Deity. Love itself, the quality most properly attributed to the Godhead, is commonly so experienced and thought of by us that when we have eliminated from it every element of physical desire, of possessiveness and of flattered vanity, the pure residuum too often seems only a chill abstraction too remote from human life to be comforting—or even particularly admirable.

Yet unless we resolutely purge our thought of these trivial personalities we shall go on making God in our own image to a corresponding stultification of religious thought and life.

5

As regards mysticism, from which we have somewhat digressed, the point I want to make is this: Whatever may be the differences in detail between the envisaged aims and technical methods of various schools of mystics, they all share the general aim of union with something greater than themselves *and are unanimous in testifying that this union can be achieved* in greater or less degree.

Now the mystic is just as good a witness as any other, provided we do not try to force him outside his own terms of reference. That is to say, unless he is a mere fraud and not a mystic at all, his account of his own inner experiences can be taken as perfectly reliable. We may disagree with his interpretation of these experiences, we may deny the objectivity of his visions, we may attribute his states of illumination or ecstasy to hysteria; but we cannot say that he is not ecstatic or illuminated; we cannot deny that the visions are real to him; we cannot dispute his experience as such.

It is, of course, entirely legitimate to study mystics (or poets, or musicians, or any other variety of genius) from the point of view of abnormal psychology and the results may be extremely interesting; but if we find that mysticism falls within our definition of hysteria we must set down the fact to the credit of hysteria and not to the debit of mysticism. Similarly, the question of whether any particular person can or should pursue the Mystic Way is altogether irrelevant to the intrinsic validity of the experiences of those who do.

I do not think I need enter here into the details of why we accept as true certain statements, e.g. explorers' reports, which we cannot directly verify, while rejecting others, such as the ravings of delirious patients, as illusory. The truthfulness of the witness is only one factor in the situation, for many truthful persons have sincerely reported events which we do not believe to have occurred. Broadly speaking, our decision is taken—or should be—on a basis of whether the matter reported is or is not tolerably compatible with other facts which we know, or have inferred to a high order of probability; that is to say, on our estimate of the combined value of the *ad hoc* and contextual probabilities discussed in Chapter VIII.

If therefore we find—as we so extensively do—that mystics of all schools report experiences which they describe as union with a Consciousness enormously more extended than their own, with proportionate liberation from personal limitations and intensification of spiritual liveliness—so that our mundane realities indeed appear as in a glass, darkly—we must not dismiss these experiences as illusory unless they conflict so violently with the established body of our knowledge and inference that their acceptability as a matter of public fact is negligibly small.

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But we have already seen that the conception of an underlying and unifying consciousness of some kind is at least plausible and indeed, as I have tried to show, practically unavoidable if we are to bring any kind of order into the chaos which the rejection of facile obviosities creates.

The essentials of mystical experience, therefore, are eminently conformable with the whole of the preceding discussion and may advantageously be concatenated therewith.

The reader, having paid his money, may be allowed to take his choice. It is merely a matter of his initial point of view whether he will prefer to regard the reported facts of mystical experience as tending to support the conclusions I have reached earlier in this book, or the latter as lending credibility to the reported facts of mystical experience. Actually, both ways of putting the relationship are valuable. If it were not for the facts and arguments here marshalled we might, as matter-of-fact scientists, be tempted to ascribe all mystical experience to not very harmful derangements of the mind; if it were not for the testimony of this so great a cloud of witnesses we might have suspected that my discussion had led to conclusions strangely poised in the air, far out of contact with the known experience of mankind.

But it seems to me that we have contrived to provide as it were a keystone, so that the two halves of the experiential arch, Mystical and Rational, join very perfectly to form a structure incomparably more stable than is either by itself.

CHAPTER XI

RETROSPECTIVE AND VALEDICTORY

I

LITTLE remains but to cast a backward glance over the progress of the discussion with the particular object of noting which of the points raised are to be regarded as of more and which as of less importance.

I hope I need hardly say that I intend the argument as a whole to be taken very seriously indeed, despite the verbal caracoles with which I have occasionally sought to enliven some seventy thousand words of otherwise unmitigated tedium; for I have no doubt in my own mind that the time is at hand when we shall see not only determined but successful efforts made to weld into a coherent whole those hitherto antithetic fragments of experience which I have preferred to call Rational and Mystical rather than Scientific and Religious. That some kind of a union acceptable to all concerned may even now be achieved, I have tried to show in these pages, but we need not flatter ourselves that the total task will be other than long and arduous.

2

My Introduction and two opening chapters are purely preparatory. The first named is concerned with circumscription of the topic and a general sketch of what I propose to attempt. The object of Chapter I is to free us from the superstition that we need pay the smallest attention to existing opinions merely because they happen

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to be professed by numerous, earnest, or even distinguished persons; there are emotional determinants amply competent to account for the profession of almost any belief by almost anyone. Chapter II seeks to show that materialistic arguments are necessarily inconclusive and can always be countered, after a fashion, even at the rather low level of discourse there adopted. The nature of proof dealt with in Chapter VII also clearly demands separate consideration in the treatment of any subject in which the word is used so freely and so indiscriminately as it commonly is in this; but the chief object of the chapter was to make clear the relation between contextual and *ad hoc* evidence, so as to prepare the way for the acceptance of paragnosis after I had shown that contextual considerations are not adverse to it.

Apart from these auxiliary chapters four points of major importance are brought out in the course of the work, in comparison with which everything else is secondary and almost negligible. The first is the liability of classical law to break down; the second, the elimination of Things-in-themselves; the third, the recognition of the fundamental unity of consciousness; the fourth, the insistence that the conception of an external world acting in consciousness must be replaced by that of mutations of consciousness as the only reality, of which some, as it happens, are conveniently regarded as external.

As regards the first, there can be no doubt that history is on my side. Classical law has unquestionably broken down often enough to make it absurd to suppose that the laws of mechanistic biology are an exception. This is the important point and I do not really care at all if my theory connecting consciousness with complexity as a public predicate proves to be rubbish. At first sight it appears seductive to my partial eyes, but I should not

be unduly shocked to find it meretricious on closer examination. Its merit is that it affords a good answer to anyone who says "Yes: I admit that classical laws go wrong, but only in extreme cases, when some feature of the situation to which they are applied is exaggerated; what feature can you point to, which is clearly both correlated with consciousness and exaggerated in situations of the kind in which we are interested?" Answer: "Complexity of organisation". But if anyone chooses to regard it as being, in the words of the immortal Pooh Bah, "mere corroborative detail intended to give an air of artistic verisimilitude to an otherwise bald and unconvincing narrative", I do not think it will make any difference.

The second point is crucial; fortunately it is also incontrovertible, though the readiness with which it will be accepted by the reader will be a matter of individual temperament. Matter-of-fact thinkers of the Johnsonian persuasion will not find it easy and may even be tempted to dismiss it with summary derision. We need not trouble about these; to more sophisticated minds, who have outgrown the cruder illusions of sensory experience, particularly to mathematical physicists who have realised that they study schedules of pointer readings and not things-in-themselves, the proposition will be evident as soon as stated; intermediately situated persons must back whichever horse their fancy favours, but there is no doubt as to which school has trained the winners of the past.

I thought it best to lead up to my third main point by way of the observable facts of paragnosis, from which it is an almost inevitable deduction. But I think I could have made it just as well by elaborating an argument which I only outlined, namely, that the only alternative is to suppose that there exists an indefinitely large number

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of isolated units of consciousness, or monads, within which modulations occur which—we have every reason to suppose—are substantially like each other. This similarity can only be accounted for otherwise than as I do either by postulating a quite incredible scheme of fortuitous parallelisms, or by assuming the existence of an “external world” responsible for the mutations. But if there are no things-in-themselves, this external world lacks foundation. Unity of consciousness is the only way out of the dilemma.

From this way of putting it, it will be seen that my fourth point is bound up with my third as intimately as is my third with my second. The three form, indeed, a triangulated structure having, it seems to me, great strength and coherence. In this structure, as in its mechanical analogues, no member is more important than another, nor would any two have much strength in themselves. It is this quality of interlocking which, to me at any rate, is the most convincing indication that the work has been conducted on approximately the right lines; if there were loose ends left lying about I should suspect that there was something very seriously amiss: surely philosophising biologists must sometimes feel a little bit uneasy at having left consciousness out of their scheme altogether?

3

The problems of the universe resemble the arithmetical conundrums of our school days in this respect at least—that if we arrive at a result which is obviously absurd we may be fairly sure that we have done them wrong.

Most of us will have disagreeable memories of this kind of thing: “Thirty-four gardeners, paid at the rate of

$1/9$ an hour, take eleven hours to mow 330 acres of lawn; assuming that gardeners work at a rate proportionate to their pay, how many gardeners at $1/5$ an hour will be needed to mow 5 acres in 7 hours?"

Applying the "rule of three" to the best of our ability we write down "Number of gardeners required is

$34 \times \frac{5}{330} \times \frac{11}{7} \times \frac{17}{21}$ ". Working this out we get the

answer 0.65532879 . . . of a gardener. This is so obviously ridiculous that, having some faith in the compiler of the arithmetic book, we suspect that we have made a mistake. A short inspection shows that we have ignored the stipulated assumption and have fallen into the very natural error of supposing that the more highly a gardener is paid the less quickly will he work. Rectifying this by simply inverting one constituent fraction we write

$34 \times \frac{5}{330} \times \frac{11}{7} \times \frac{21}{17}$ and, to our delight, find that everything cancels out nicely, yielding an answer of—One.

In the same sort of way, if we have to postulate one insanity to account for another, if we must bolster up one preposterous and unlikely theory by straining a second into an equally unconvincing shape, if we find that the further we go the more we must complicate the explanatory mechanism and add causes in endless regression and in defiance of the law of parsimony—then we may be pretty sure that we have a mistake somewhere. And as I pointed out in my eighth chapter, the fault is much more likely to be with our assumptions than with our logic. But if we find that, by challenging and inverting one or two of these, everything runs together, as it were, with a satisfying click—as when we add 1 to 999,999,999 on a calculating machine—well, the odds are about 999,999,999 to 1 that we are right!

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I venture to believe that, if we adopt the views I have submitted, things do drop into place in this satisfying sort of way; and in the last resort I think that this is a better criterion of the worth of a theory than the impeccability of the individual arguments which led up to it.

It is, indeed, more instructive to review what we have denied than what we have affirmed; for it has been rather by breaking up existing assumptions than by making new ones that we have progressed.

We have repudiated the following contentions:

(1) That consciousness—the *sine qua non* of all experience—should be ignored by scientific enquiry.

(2) That classical law in the particular department of mechanistic biology is inviolable, despite the breakdown of such law in other fields.

(3) That there exist, in any real sense, magical things-in-themselves, somehow mysteriously possessing, producing or supporting the phenomena which alone we know, and always shyly declining to appear in the formal relations connecting these phenomena.

(4) That there is an antithesis between consciousness and matter—non-existent matter, if the denial of 3 be correct.

(5) That the whole of the phenomena of apparent paragnosis (less a negligible percentage due to fraud, etc.) is to be attributed to chance coincidence.

(6) That complex, yet undetected, analogues of “wireless” transmitters and receivers may be located in our bodies, working automatically on an unknown code and in a manner at variance with all known phenomena of radiation.

(7) That (non-existent) “things” can act only where they are.

(8) That the totality of consciousness is made up of innumerable discrete and isolated units, the apparent correspondence of mutations therein being purely coincidental.

(9) That these isolated units are linked by the existence of an “external” world made up of the things-in-themselves repudiated in 3.

I find it difficult to suppose that anyone will wish seriously to defend a single one of these; yet most of them are necessary for the maintenance of any materialistic view whatever, and the conceptions here advanced alone seem capable of eliminating them all.

4

These conceptions are admittedly difficult to assimilate, but it cannot be said that they are in any sense complicated. On the contrary we effect a tremendous simplification of explanatory mechanism and a notable economy of hypothesis. William of Occam will certainly applaud, though I feel that Hegel is a trifle uneasy.

In the house that we now envisage there are many mansions. Nothing need be or can be excluded, since the modulations of Universal Consciousness constitute, literally, all that is. Every intelligent enquiry of whatever kind, whether we call it scientific or by some other name and whether we express the result in verbal or in mathematical symbols, consists in ascertaining and stating the formal relations which link the modulations with each other *and in nothing else whatever*.

Some of these formulae will be much more difficult to discover and to state than others, but, in principle, this is what our task invariably amounts to; there can no longer be any magical barrier or any radical discontinuity between one field of enquiry and another.

In particular we find, in the same universe of discourse, the raw material of physics and psychology, the foundations of natural religion, the meaning of spiritual progress, a basis for Ethics and a rationalisation of Altruism.

A sweeping claim, perhaps; certainly to expand and

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justify it fully might well occupy many stout volumes, so that a few expository remarks of almost telegraphic brevity must suffice here.

The raw material of physics consists of "schedules of pointer readings"¹ and these form a special class of modulations of consciousness. I suspect, though I certainly will not commit myself, that this class is characterised by some such cyclic linkage as that described by Sir Arthur Eddington on pages 260-4 of his book.

The raw material of psychology consists, I think, of most of the modulations not in the class just mentioned; I am tempted to say "all", but that sounds rather too inclusive. I should be sorry to have to say where psychology leaves off and other fields of enquiry begin, but fairly satisfactory, if somewhat vague, compromise may be reached by saying "all modulations directly relevant to behaviour".

The foundations of natural religion are clearly to be found in a study of the relations existing between the Universal Consciousness considered as a whole and those partially isolated concentrations thereof which we are accustomed to describe as individuals.

Spiritual progress can be rendered intelligible in terms of the expansion of the individual consciousness—its de-isolation, if you happen to like the word, its liberation from limitation if you do not.

The same conception yields a basis for Ethics, in that we shall define as "good" that which promotes this liberation.

Finally, altruism is rationalised inasmuch as we clearly cannot, even if we would, live unto ourselves alone.

¹ I suspect that the still more general material of bare relations and relata can be built into a good deal more than physics only.

Well—the time has come for putting off my harness, but I cannot say that I feel particularly inclined to boast.

We have had some sharp exchanges and the sparks have flown; but even if, as I flatter myself, I have mortally wounded my opponent there can be little doubt that the poor fellow will be an unconscionable time adying. This is only to be expected and does not greatly trouble me, for I am more interested in the structure I have reared in the intervals of the fighting than in the battle itself.

And I must confess that, when I view the building in perspective, I am as much struck by the irregularities in execution as by the symmetry of design. I console myself with the reflection that the strong, graceful columns and delicate traceries, which we admire so much to-day, are never more than rubble for the concrete of to-morrow; so that if I have provided serviceable material or a suggestive plan for the erection of a nobler edifice, I may be well content.

At any rate I may claim to have made a sincere attempt to eradicate traditional prejudice from my treatment and to preserve the most astringent attitude compatible with my enthusiasm for the work.

EXPLICIT

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